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INTERFACE

JULY 1981
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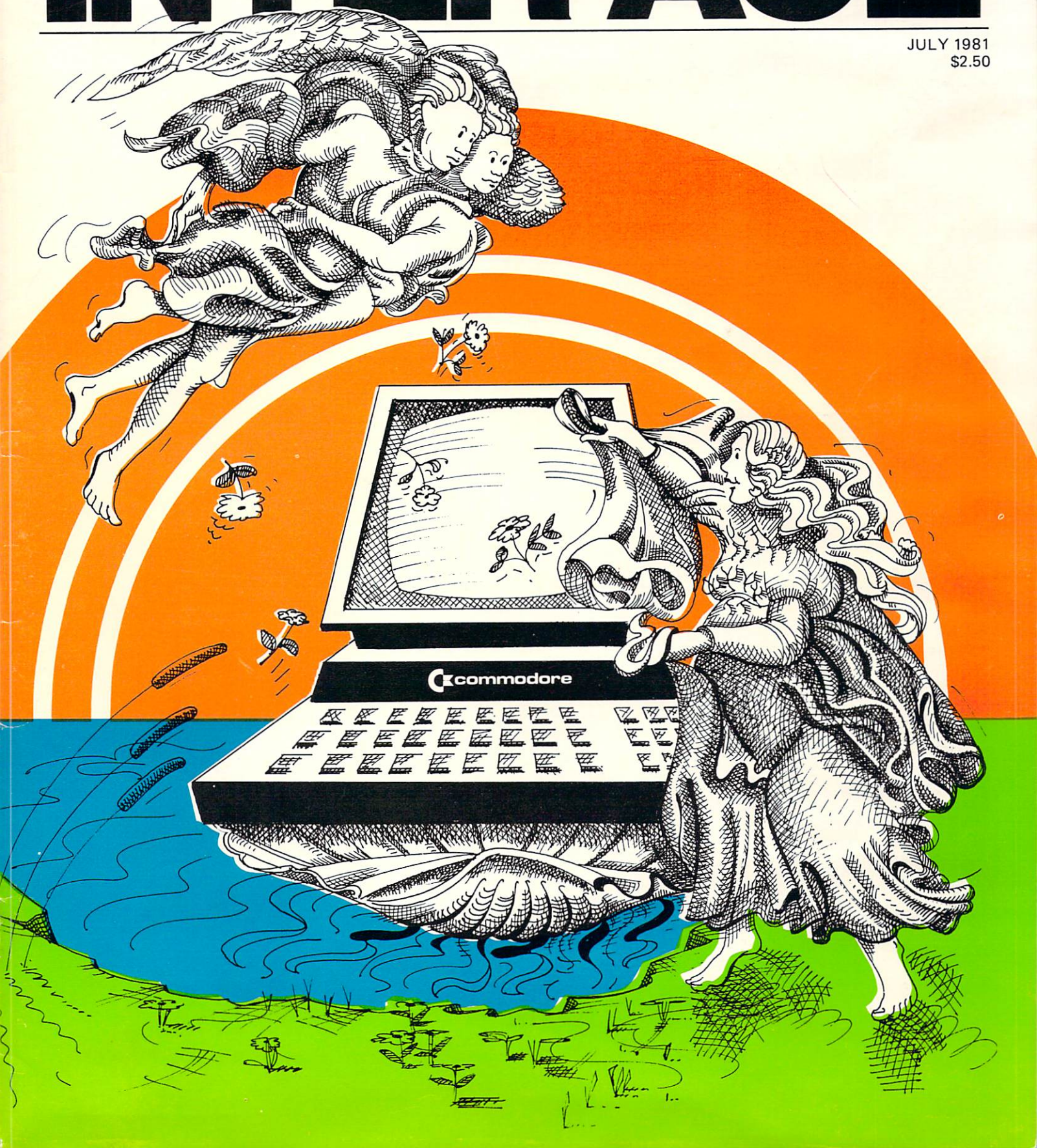

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Why should any law firm be sentenced to long hours of paperwork? With a Commodore computer, you can spend all of your time doing what you do best: law.

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You'll see how our computer can print out customized statements, billing analyses and more. Fact is, our computer can do just about anything a law firm needs except practice law.

So if you're part of a law firm that can use some legal aid in your paperwork department, do yourself justice and try a Commodore CBM computer. It's that simple.

We rest our case.

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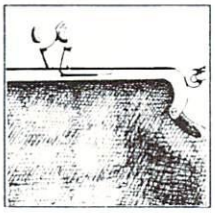

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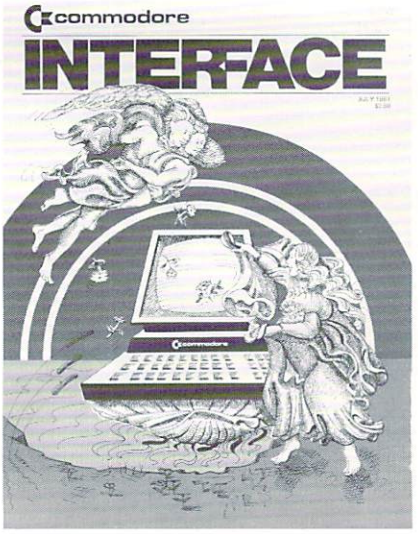

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INTERFACE

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Q&A HOTLINE

Q. How do I delete and re-use records from a random file for systems using BASIC 3.0.

B. Stewart, W. Baraboo, Wisconsin

A. *The command for deleting files from a disk in 3.0 BASIC is:*

SCRATCH DR:fn

Where Dr is the drive number and fn is the file name. So, if for example you wanted to delete a file called "junk" on drive number 1, you would type the following:

```
10 OPEN 15, 8, 15
20 PRINT#15, "SCRATCH1:JUNK"
30 CLOSE 15
```

You can abbreviate SCRATCH in line 20 to S, e.g., "S1:JUNK"

Q. I just recently purchased a second hand CBM 2001-32K (BASIC 3.0) and an 8050 dual drive. What I got on an as-is basis was the processor and drives but no manuals or DEMO disks. So far, I'm as pleased as punch with the system. However, right now I am using the new Osborne PET users manual, plus I purchased a 2040 manual. Are there any others that would be good to run out and buy?

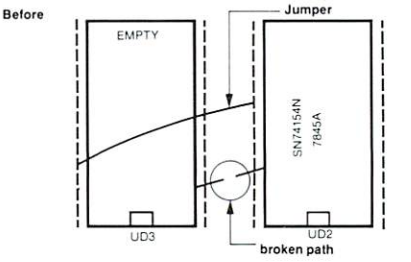
B. Heckler, Oklahoma City, Oklahoma

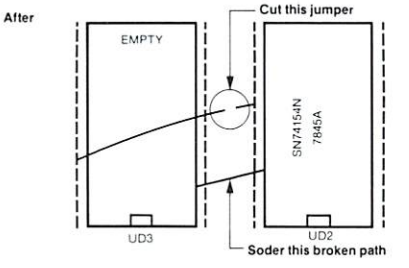
A. *First, it would be wise to upgrade your machine to 4.0 ROMS (for a nominal charge), which will give you disk commands that greatly facilitate your disk operations and also keep you current with the latest software being developed on Commodore machines. You may also want to get a copy of the disk manual which should have been supplied with your machine when it was new. The utility disk (or demo disk as it is called) is not essential for normal disk operations with the 8050 unit. However, it does have a few nice utilities such as changing device numbers, etc. To order this material, contact your nearest dealer or call the Commodore Hotline at 1-800-523-5622 and we will direct you to the nearest dealer. The Osborne book (second edition, with the white cover) will provide you with all the commands you need in both 3.0 and 4.0 ROM versions. It is a good supplement to the user manuals and could be used in place of them if you cannot get copies of the manuals supplied with your unit. The Osborne book should be available at a local bookstore.*

Q. My 32K Business Computer serial no. 0810622 with Board no. 135015721 will not function properly with Visicalc ROM in UD3 socket. The screen is filled with random characters with no keyboard control. There is a factory installed jumper and an open printed current path between UD2 and UD3 (see illustration). What should be done to the board to enable UD3 for Visicalc ROM.

M. Evans, Northbrook, Illinois

A. *Cut the new jumper and re-solder the old jumper so that the original configuration is restored (see illustration). This should enable you to use UD3 for Visicalc.*





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Everyone expected it would happen sooner or later...with WordPro PLUS™ it already has! Now all the marvelous benefits of expensive and advanced word processing systems are available on Commodore computers, America's largest selling computer line. WordPro PLUS, when combined with the new 80 column CBM 8032, creates a word processing system comparable to virtually any other top quality word processor available—but at savings of thousands of dollars!

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Editor's Notes

Each issue of **COMMODORE INTERFACE** contains numerous accounts of people using Commodore equipment in unique and ingenious ways.

Yet, while Commodore products are fun and easy to use for most of us, there exists a large segment of our population (almost 36 million) for whom the possibility of using a computer is remote – the handicapped.

With the great strides being made in technology, specifically with microcomputers, Commodore feels it is vital to develop and maintain programs that will enable millions of handicapped Americans to keep pace with our computerized society.

In order to become independent and self-sufficient, disabled persons must be given the opportunity to use their skills and abilities to the fullest. And, that includes working with computers.

Possessing a knowledge of computers can and should have a profound impact on a handicapped person's ability to live and work where he or she rightfully belongs – in the mainstream of society.

Therefore, beginning with the September issue, Commodore will add a new section to **COMMODORE INTERFACE**, devoted to hardware and software products that help handicapped persons to easily use Commodore equipment.

If you have any information regarding products being used or special work being performed with Commodore equipment, please write and tell us about it. Send all information to:

Editor
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681 Moore Road
King of Prussia, PA 19406

Paul Fleming

Editor

COMMODORE NEWS

Attention Subscribers

We have received many letters requesting clarification of the status of subscriptions now that we have changed from the monthly Commodore PET Users Club Newsletter to the Commodore Interface bi-monthly.

Those of you who subscribed before the publication of the February 1981 issue of the Commodore Interface are in our records as a 12 issue subscription. Anyone who subscribed after that issue was published is in our records as a six issue per year subscription.

The mailing label on each issue will tell you how many issues you have "to go" before your subscription expires. You will also be sent a renewal notice before the mailing of the last issue of your subscription.

The only back issues which are available are Volume 1 Issues 1, 2, 3, 4, & 5 (a double issue), 8, 9, and 10 of the Newsletter; and the February, May and July issues of the Commodore Interface. Due to the irregularity with which the Newsletter was published and the variety of requests for specific issues, we have assigned a value of $15.00 for six back issues, with the ability to credit your record for future issues if you request more or less than six. For example: you could send $30.00 and get the 10 available back issues and a credit for two future issues, or send $30.00 and get issues 8, 9, 10, February, May and July and a credit for six issues for the next year of the Commodore Interface.

I hope this has clarified the situation for everyone. If you have any questions or problems with your subscription; if you have missed receiving any issues; or if your mailing label is incorrect, please feel free to contact me. Thank you.

Patty Hesser
Circulation Manager, Commodore Interface

Welcome Aboard!

Congratulations to the following groups, who have joined the lengthening ranks of dealers selling Commodore computer products. . .

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205-689-4999

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717-552-5076

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Fairfield Computer Center
Fairfield, CA 94533
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415-692-5600

Infomax
Walnut Creek, CA 94596
415-935-5153

Integral Biomedical
Sacramento, CA 95825
916-920-1377

Professional Business Systems
St. Helena, CA 94574
707-963-4279

Ray Morgan Company
Chico, CA 95926
916-343-6065

The Computer Place
San Jose, CA 95125
408-448-3208

3E Software & Systems
Hayward, CA 94542
415-537-3637

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Cupertino, CA 95014
408-725-1660

Insurance Data, Inc.
Boulder, CO 80303
303-449-9382

MicroAge Computer Store
Aurora, CO 80014
303-696-6950

Zero Page
Manitou Springs, CO 80829
303-685-1418

Guillilland Wholesalers
Washington, DC 20001
202-338-6272

Society for Visual Education, Inc.
Atlanta, GA 30307
800-621-1900

Great Bend Office Supply
Great Bend, KS 67530
316-793-8479

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207-873-2192

Maine Computronics
Bangor, ME 04401
207-947-0738

Potomac Business Equipment
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Computer Place
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Computer Town, Inc.
Salem, NH 03079
603-893-8812

Echo Consulting Services
Conway, NH 03818
603-447-5455

Computer Marketing Systems
Cherry Hill, NJ 08002
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716-372-4008

Semi-Specialists of America
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516-293-2710

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Bond Office Equipment
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F & M French & Son
Albany, OR 97321
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Audio Visual Services, Inc.
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713-659-1111

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ETC Services
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Dallas, TX 75230
214-739-1100

Microcomputer Shoppe
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Indian Tree Enterprises
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802-457-3879

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Total Office Concepts
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307-632-9913

TRW To Service Commodore Microcomputers

Commodore Business Machines, Inc., and TRW Inc.'s Customer Service Division have announced a five-year, $10-million agreement under which TRW will service and maintain Commodore microcomputers through out the United States.

Service of Commodore equipment, both on-site and at walk-in depots, will begin in September when the first group of technicians at TRW service centers will have completed training on Commodore hardware. Currently, TRW has more than 2,000 skilled technicians at some 220 locations providing service to over 80,000 customers.

Commodore products to be serviced under the agreement include the CBM 8032, the PET 4000 series central processor with 8040 universal logic board, 4040 and 8050 disk drives, 4022 matrix printer, and 8010 communications modem.

As part of the agreement, TRW will have a substantial inventory of spares, consumable parts, and specially designed testing equipment, as well as trained personnel.

Both Commodore and TRW emphasize that nothing in the agreement precludes dealers, distributors, or customers from performing their own maintenance service or obtaining service from other suppliers.■

Commodore Launches the 3200 Series Electronic Cash Register

Commodore Business Machines has introduced a family of innovative point of sale terminals that have revolutionized the cash register market. With these products, cash registers have reached a new level of sophistication, flexibility, and cost-efficiency.

The computerized cash registers can be incorporated into various applications such as food stores, general merchandise, fast food, bar and restaurants, and other specialized areas.

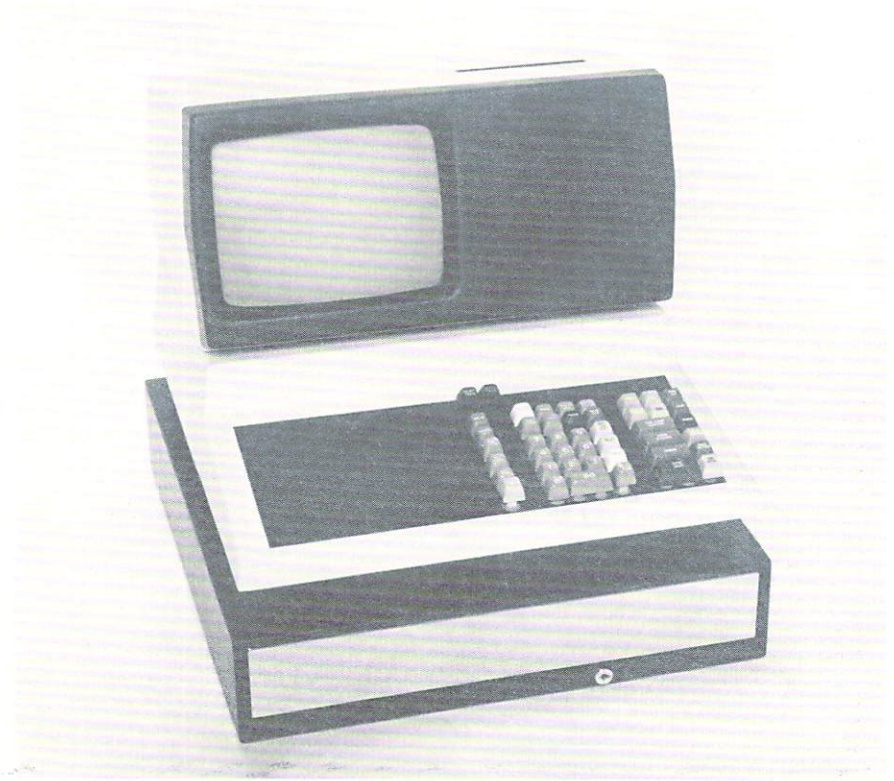
These versatile point of sale terminals offer retailers complete up-to-the-minute sales and financial information; improve and speed customer throughput; establish cashier responsibility, measure productivity; and ensure strict control over transactions at all times.

Each system includes a 6502-based CBM microcomputer with built-in nine inch CRT display; 32K user RAM; receipt and detail printer; cash drawer; and optional disk storage unit.

Numerous programmable software, operation, and tendering features are also standard with the systems.

Now, with business computers and cash registers, the Commodore product line provides a total system – from point of sale to the back office.

For additional information on the point of sale terminals, write to Commodore Business Machines, 4350 Beltwood Parkway South, Dallas, Texas 75234, or call 800-527-0734. In Texas, call 800-442-5106.■



COMMODORE NEWS

NCC

The National Computer Conference is the largest computer show held in the United States. An annual event, it attracts exhibitors and participants from around the world. This year, over 70,000 people gathered at McCormick Place in Chicago, trecking over ½ million square feet to view the newest and most innovative computer products.

Seminars on just about every computer application imaginable were also conducted throughout the four-day NCC run.

For Commodore, NCC provided the stage to announce more new hardware products than at any other time in the company's history, as well as highlighting current products and applications.

Mr. Irving Gould, Commodore's Chairman of the Board capped off the first day of NCC with a press conference that highlighted new products and gave an insight into the direction Commodore is headed.

These products included the "Super PET", 8250 – 2M Byte Dual Disk Drive, and the 2031 Single Disk Drive.

The SuperPET expands the standard Commodore 8032, adding 64K bytes additional RAM, five language interpreters (BASIC, FORTRAN, Pascal, APL and COBOL), plus built-in standard RS-232 communications.

Users who want to start exploring the added capability a disk unit brings to the PET/CBM will find the 2031 single disk drive the ideal solution. The 2031 stores up to 170K bytes on a single 5¼" diskette, and incorporates a built-in IEEE-488 interface. This unit offers all the intelligent functions of its dual drive 4040 cousin.

On the high end, the Commodore 8250 dual drive unit offers an unprecedented 2.1 million bytes of online storage. It, too, offers intelligent features such as: automatic diskette initialization, automatic directory search, relative record files, sequential file manipulation and improved error recovery.

Mr. Gould explained that with the introduction of these new products, Commodore places itself as one of the few manufacturers that offers such a varied and complete microcomputer line.

In addition to the new and current hardware and software products at the Commodore booth, a special promotion to win a VIC-20 computer also attracted tremendous interest.

Visitors were given an integrated circuit "chip." If their particular chip worked when placed in a CBM computer that was setup in the booth, they won a VIC-20. In all, 12 VICs were won.

With all that goes on during NCC, it's impossible to see everything even with four days. However, it was obvious that people took the time to stop by the Commodore booth. In all about 10,000 gathered literature, tried to win VICs and got hands-on experience with the latest equipment. ■

PET Cake

Describing our low-cost versatile PET computer normally requires terms such as ROM, BASIC interpreter, green phosphor screen, RAM, parallel port, cassette ports, etc.

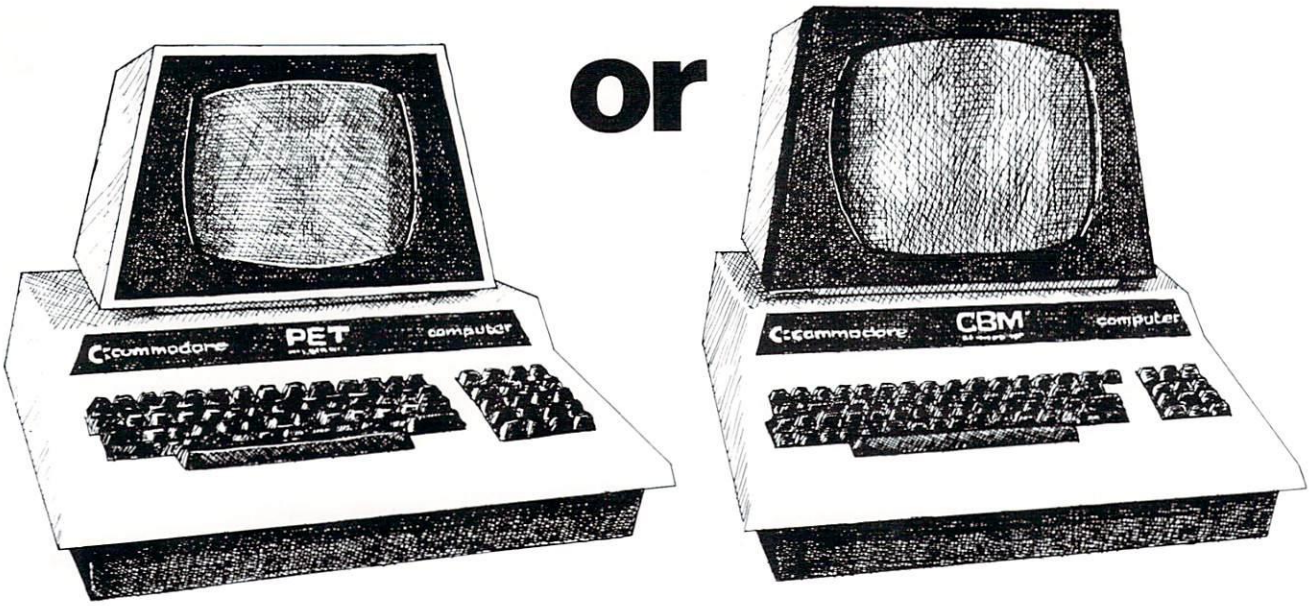
But have you ever seen a PET computer that contains "ingredients" such as: eight pounds of white frosting, fudge filling, eight white cake mixes, candy bars, and dyed, uncooked alphabet macaroni.

This unique PET was not manufactured for business, educational, or scientific applications. Rather, it was made to be eaten.

The PET cake was created by Sarah Jo Gilpin-Bishop and her husband Frank Bishop to mark the third anniversary of their computer group. By the way, it should be noted that consumption of the PET cake was total.

We've always said PET Computers are easy to use. This just proves they're a piece of cake! ■

BUTTERFIELD ON COMMODORE



What Hardware Do I Have?

By Jim Butterfield

Jim Butterfield, a highly recognized expert on Commodore hardware and software, has been involved in the microcomputing field since 1966.

In the past, users could often tell their PET/CBM machines apart by the size and shape of the keyboard, or by the message that was displayed when power was turned on. That doesn't work too well any more. New keyboards can be fitted to old machines, new ROM sets can be plugged in, and even the green screen/white screen isn't much of a hint any more.

Although I'm not a hardware man, I often get calls from users who want to know about some aspect of their machine. I try to establish which machine they are talking about. Commodore may have a much more official checklist for their hardware configurations, but here's the set I use. Perhaps readers can suggest other differences that are worthwhile knowing.

The first two items are pretty obvious. How many columns on the screen – 80 or 40 – and what type of keyboard. I'm not concerned with tiny versus full-sized keyboards. Rather, is it a simple graphics keyboard or a full-scale business ASCII layout? The easy way is to look at the top row, above the alphabetic letters. The ASCII keyboard features numbers along the top row, while the graphics keyboard contains just symbols.

Next, does your PET have original architecture or the more recent layout? The tipoff here is the connector on the righthand side of your machine. If you see an edge-connector (a connector with copper "fingers" extending from the board inside) you have the original machine board. On the other hand, if you can see a series of upright pins when you peer through the right hand slot, you have a more recent board. Another way of telling the same thing is to type POKE 59409, 52. If the screen goes blank when you press RETURN, you have a unit with original architecture. Another characteristic of the early machines is ap-

parent when FOR J=1 TO 1000: POKE 32768.0: NEXT J, which causes a lot of "snow" on the screen for a few moments. Newer machines don't have this problem.

The next thing to test is the screen writing speed. Clear the screen, and on the top line or two type:
TI$="000000":FOR J=1 TO 600:PRINT "A";:NEXT J: PRINT TI$ and press return. You'll get a lot of letter A's across the screen, followed by a number. If the number is 000002 or less, you have a fast screen machine. If it's larger, you have a slower screen unit. Don't worry – the speed difference is only seen when writing characters to the screen, and you can't read that fast, anyway.

There are other hardware differences that you'll find in various PET/CBM machines, but the above are the ones I ask for most often. Technical tyros will be glad to add to the list. What kind of RAM is fitted? How are the ROM-sockets decoded? . . .and so on.

Many other differences that we notice between machines seem to be hardware, but they're really software. It's quite surprising how different logic can make the machine appear physically different.

Some people claim that cosmetics made a great deal of difference to a computer's usefulness. I suppose it's part of your state of mind. I've seen PETs with racing stripes and others with pink polka-dots. If the owners feel that they can write better programs that way, good. I'm thinking of painting one of mine puce-colored in the hopes that it will keep the cat away.

What Software Do I Have?

There are (at time of writing) three general styles of PET/CBM software ROMs. ROM stands for Read Only Memory – their programs are set at the factory and cannot be changed. That's OK – few of us have the talent and/or ambition to change the internal workings of our PET/CBM system, and even if we did we'd lose one of the great advantages of the home computer, the ability to exchange programs with others. The ROM programs, being pre-written and burned in, are there the moment we turn the power on.

I call the three generations of Basic: Original, Upgrade, and 4.0. The first two generations had confusing number systems. Some Commodore divisions called Original ROM sets Basic 1.0, while others called them Level 2 Basic. When the Upgrade system arrived, the numbers changed to Basic 2.0 and Level 3 so as to make the confusion one hundred percent. By the time 4.0 Basic came along everybody synchronized, and the machine printed BASIC 4.0 to end the problem once and for all.

Within each Basic version, there are small differences to accommodate variations in the hardware. The Business or ASCII keyboard – the one with numbers across the top row – needs to be scanned in a different way than the graphics keyboard. And 80 column screens must be worked in a style that differs from the 40 column display. These differences are reflected by changing one ROM out of the set to allow for the configuration desired. The other ROMs in the set are the same regardless of hardware.

The first Basic came as part of the Original ROM set. It had a lot of limitations. You couldn't put more than 256 items into an array; you couldn't do a successful IEEE-488 input; you had no machine language monitor; and tape data files had potential problems. Most users breathed a sigh of relief when the newer Upgrade system became available.

If you have Original ROM Basic, your PET will power up with the message: ***COMMODORE BASIC***. The asterisks are the signal that you have the original system. If you have this early Basic, it's worthwhile thinking about moving up by obtaining a replacement ROM set. You'll get technical benefits. More important, you'll be joining the mainstream of PET/CBM users and be better equipped to exchange ideas and programs.

Upgrade ROM solves the above limitations. Users with Upgrade ROM will see ### COMMODORE BASIC ### when they turn the power on. Whether you call those symbols pound signs, number symbols or hash marks they clearly flag Upgrade ROM.

Users with original hardware can refit their machines to Upgrade ROM, but they will have trouble in taking the next step to 4.0. It's not just that they are missing the ROM socketing to plug everything in. They would also find that screen "noise" would start to give trouble. Basic 4.0 doesn't politely wait for the screen to be ready before delivering new information. . .characters are slapped in at full speed. Newer machines won't see any problem, but the original boards may end up with a screen that looks like a snowstorm.

The newest Basic so far is 4.0 and it's easy to spot. The screen announces the number. The changes here are useful, but not essential. You get new commands for disk, such as DLOAD, CATALOG and SCRATCH. You get somewhat better file handling, and that great time-waster, garbage collection, has been speeded up so that it is no longer annoying. In many respects, the 4.0 improvements are largely cosmetic. They support ease of use rather than eliminating road blocks.

There's great compatibility between the various versions of Basic, especially between Upgrade and 4.0 ROMs. Each user tends to exploit the features he is given, however, so that programs on a more recent model may not be able to time-travel back to earlier versions. Still, they are all PETs. They all have that style. ■

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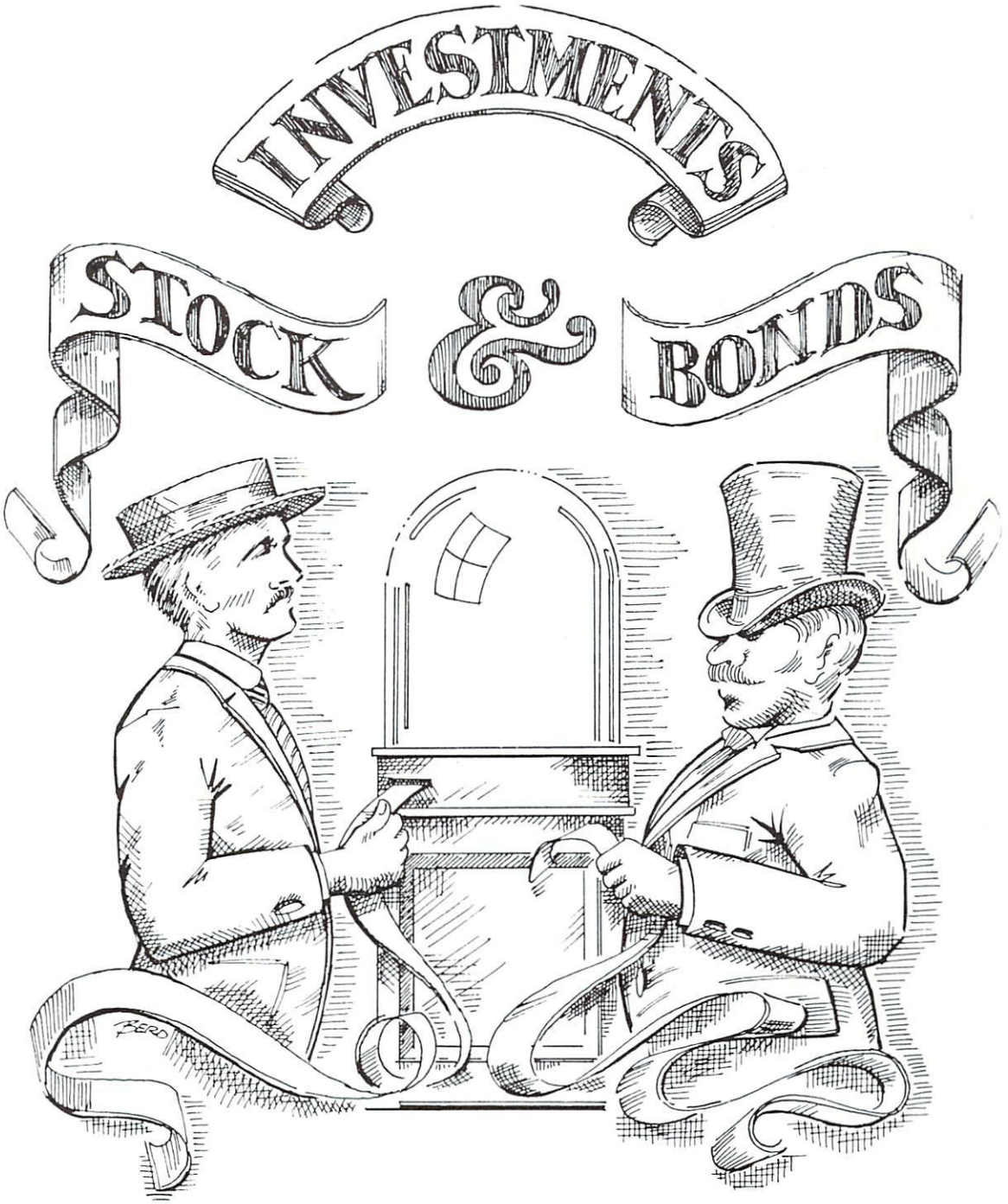


Dow Jones Portfolio Management System

Any inventor who seriously follows the progress of the stock market knows the importance of spotting trends, summarizing data, identifying opportunities, and projecting growth. Part of the investor's success depends on the ability to quickly access current pricing and financial information. Of course this information, no matter how valuable, becomes useless unless it is efficiently maintained. Frequently, losses or gains depend upon an accurate portfolio.

The Dow Jones Portfolio Management System (PMS), which was created by Micro Business Systems, Inc., provides the serious private or professional investor with the means to keep that portfolio current. PMS allows immediate access to pricing and financial information. In addition, the system satisfies the need for maintaining a person's portfolio of securities.

One or more security portfolio's accounting information →

can be maintained, and the system can access up-to-date prices and financial information, which is only available through the Dow Jones News Retrieval Service.

PMS allows maintenance of stock portfolios, automatic valuation of positions in the portfolio, retrieval of current and historical quotes, and displaying/printing of news stories.

The Portfolio Management System operates with the Commodore 8032 or 4032 Computer; a Commodore 8050 or 4040 Dual Disk Drive; the Commodore 4022 Tractor Printer, or Mannesmann Tally 8042 Printer, and most suitably interfaced ASCII printers. A TNW Auto Dialer Modem is also required to automatically access the Dow Jones Data base.

Ease of Use

PMS is menu-driven, which makes the system easy to operate even for the first-time user. Menu driven means that the system is designed to guide the user through a particular task. For example, PMS provides a Master Menu, which allows you to easily choose the function you wish to perform. After making a selection from the Master Menu the user is automatically guided through the task selected. The following functions are listed on the Master Menu:

1. Transactions
2. Data Retrieval
3. Portfolio Valuation
4. Reports
5. Portfolio Maintenance
6. System Setup
7. Utilities

Each of these functions can be easily selected by keying in the corresponding number from the Master Menu. A significant feature of PMS is the accessibility it offers for even the busiest executive.

Yet while information is available in an instant with PMS, more important is the timeliness and accuracy of the data provided by the system. In fact, 90 seconds after a news story breaks, it is in the database ready to be accessed.

A further convenience is selectivity. PMS quickly retrieves only the information you request. Even if you have been unable to keep up with the news for several weeks, you can quickly scan the headlines and choose only the stories you feel are relevant.

News Retrieval

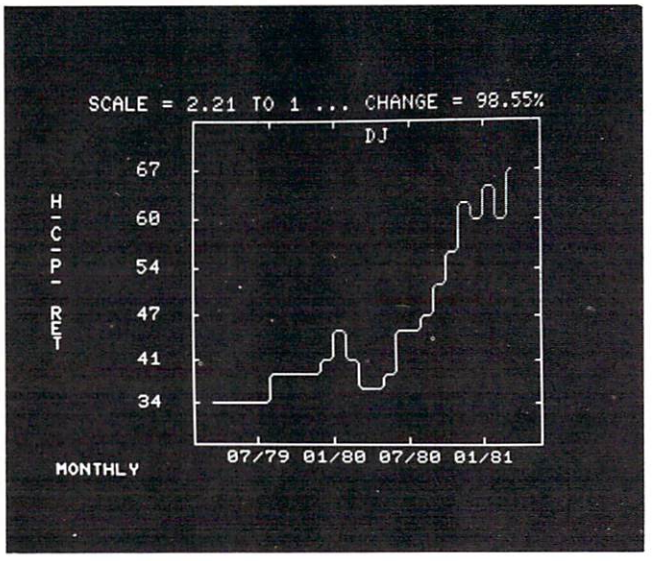
With PMS you can display or print news stories as old as 90 days and as recent as 90 seconds. This is the same information Dow Jones continually gathers for the **Wall Street Journal**, **Barron's**, and the Dow Jones News Service. This data is available for over 6,000 stocks and selected news categories in the Dow Jones Data Base.

When you want to see the news for a particular stock, you enter the stock symbol. The system then retrieves and displays headlines for stories relating to that particular stock. A two-letter code is located to the left of each headline. This story identifier code is used to identify the specific news article you wish to review. You have the option of viewing a news story on the screen display or, if you have a printer, generating a printed copy.

Quotes and Profiles

PMS provides price information for common and preferred stocks, warrants, listed bonds and stock options. The stock prices are the composite of four U.S. exchanges: New York, American, Pacific, and Midwest. In addition, Historical Quotes are maintained on a daily basis for the previous 24 days and on a monthly basis for the past 24 months. These quotes are available for common and preferred stocks and warrants, and for all New York Stock Exchange, American Stock Exchange, and over-the-counter traded companies.

Historical quotes can be displayed or printed in graphic form, providing a visual perspective of a particular security's activity.



Portfolio Management

The portfolio management function of PMS accomodates buys, sells, short sells, and buys to cover short sell transactions. Security information is added, changed, or deleted. PMS accumulates the data on a year-to-day basis, providing and accurate audit trail. This information is available in

report format. Other available reports contain information on current position, cash transactions, and current value of your portfolio. A screen report is also available for reviewing unrealized gains and losses.

PMS provides you with an automatic and efficient cash control system, which reflects an up-to-date cash balance including realized gains and losses. The system also accommodates cash contributions and withdraws. And for tax purposes there is a report for all completed transactions.

Media General Financial Services

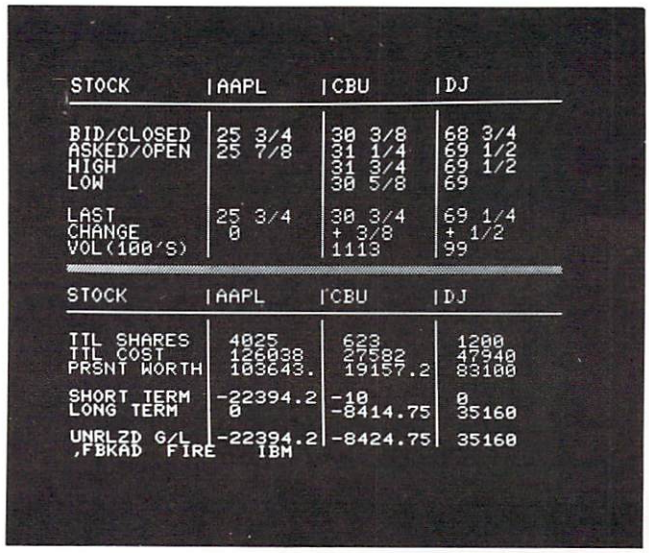
In addition to the standard Dow Jones package, PMS also provides access to Medial General Financial Services. Media General provides information such as revenues, earnings dividends, price earnings ratios, and stock price performance relative to market indicators on 32,000 companies.

Media General also offers composite information on 180 industries in groups such as natural resources, industrial products, consumer durables, transportation, and utilities.

Instant access is provided for reviewing five-year growth rates of earnings and dividends. Other information includes five-year highs and lows for stock prices and price earning ratios for each company and industry in the data base.

Who can Use the System

While PMS is an obvious asset for stock brokers and investors, it can be used effectively by portfolio managers

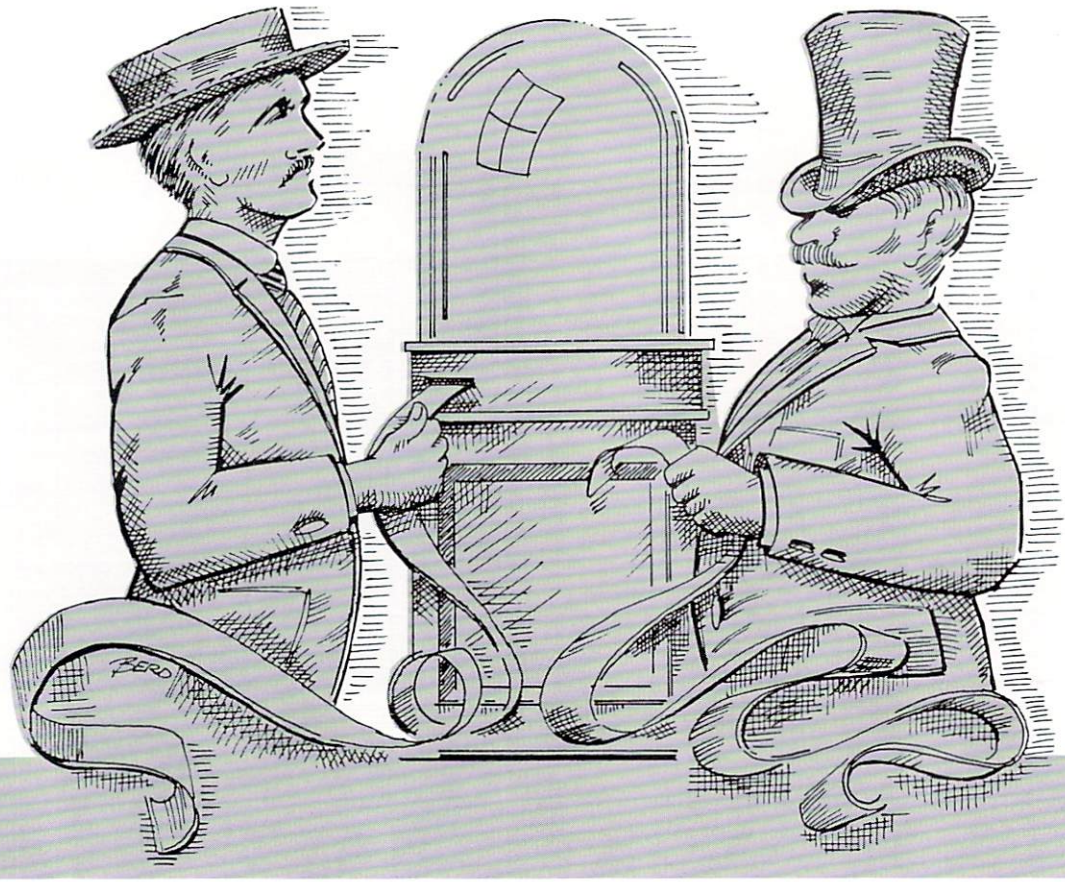


and IRA account managers as well. PMS is also a valuable educational tool. For example, schools that offer courses in financial management could reap the benefits of the same system used by professional and private investors. PMS would also be a welcome addition to investment clubs.

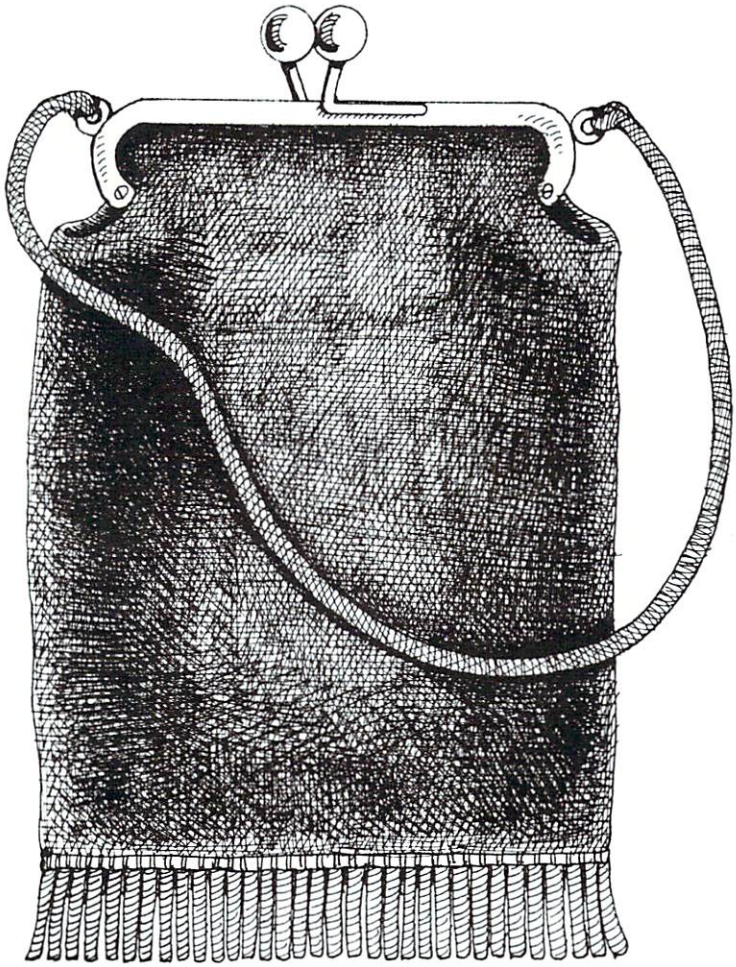
Availability

The Dow Jones Portfolio Management System is available now from any authorized Commodore dealer. The retail price of the package is $149.95. Purchasing PMS may be one of the smartest investments you'll ever make.

BUSINESS NEWS



Commodore's Portfolio Management System	Apple
• Uses a scrolling system to enable the positioning of text on the screen.	• Erases screen after a "page" is complete.
• Provides historic quotes, both daily and monthly.	• Does not provide any daily or monthly quotes.
• Provides the ability to graph.	• No ability to graph is provided.
• Enables user to see 1 - 5 quotes at a time.	• Enables user to review only 1 quote at a time.
• Has short-positioning capability.	• Has no short-positioning capability.
• Options/bond prices kept in portfolio positions.	• No option/bond prices kept in portfolio positions.
• 35% more data on screen (than Apple); therefore PMS uses screen space more efficiently.	• 35% less data on screen.
• Combines functionality of Apple's systems from 2 disks to 1 disk.	• Less functionality on more disk space (2 instead of 1) causing awkward and time consuming disk removal and replacement.
• Continuous Dynamic data retrieval – (never ceases retrieval of data even while user reads).	• Static data retrieval – (only retrieves one "page" of data at a time).
• Terminal mode – prints whatever appears on screen or prints entire story.	• Can only print per story, not selections of story or what is up on the screen at the time.



PET Controls the Purse Strings

Theodor of California is one of the leading manufacturers of handbags in the United States. They distribute coast-to-coast, employ about 200 production people, and are engaged in manufacturing a product which has a high labor content, yields a low profit margin and is seriously threatened by foreign competition. Their business is labor intensive with substantial seasonal fluctuations, and constant trend changes. They are engaged in a fiercely competitive business in which new methods for containing and lowering costs must be adopted if the business is to survive. It was in its search for greater efficiency that Theodor hired the management consulting firm of Victor Ardon & Associates.

Victor Ardon & Associates specialize in helping clients, usually manufacturing plants, reduce costs and improve efficiency. Ardon has found that the use of microcomputers is one of the most cost-effective tools available in helping their clients. Over the last few years Ardon has installed PET computers at a number of sites. In 1978 Ardon installed the first PET computer at Theodor of California to help that company estimate the cost of manufacturing a particular style of bag they were considering. Since that time Ardon has incorporated two more PET computers into Theodor – one to create tickets, used in their incentive program, and one to manage the warehousing of the bags they produce.

Costing

Producing handbag styles that sell involves keeping pace with the whims of the fashion world. New styles are brought into the line at least four times a year. Producing profitable handbag styles involves creating bags that are attractive and fashionable enough to sell while keeping the manufacturing costs down. Although there may be no more than 30 bag styles in any one line, it may be necessary to cost out 100 styles before putting a line into production. Costing, the art of estimating all the manufacturing costs of an item before it is produced, involves determining both material and labor expenditures. Traditionally, this is done by sitting down and producing a copy of the item.

The first step in determining material cost of a particular bag is collecting and inputting the unit material cost (e.g., price per yard of fabric or clasp prices). With the PET computer, information about both material and labor costs need not be entered for every costing since once entered it remains stored in the system's memory and can be periodically adjusted using an inflation factor. The computer asks for the dimensions of each piece that will be used, adds an appropriate scrap factor, makes any appropriate adjustments, and then goes on to calculate each component's cost. When all material costs are in, the computer arrives at several sub-totals, giving a breakdown for each type of material as well as a total for all material costs.

Labor is calculated differently. A list of all the possible operations necessary to produce any type of bag and the time each operation requires is maintained on disk. In order to determine →

"ideal" labor cost the computer loads this standard data file into its memory, selects the operations which apply to a given style, and adds up these figures. This ideal figure is then factored by an effective performance rating of any given department to obtain a realistic reflection of anticipated actual labor costs. If the style is totally new, a "learning curve factor" can also be added.

The computer can also add any extraordinary costs, such as overhead and indirect labor. Ardon estimates that this costing method is four times as fast as the previously used manual system. The present costing system is so much more efficient than the old system, that many more samples are actually being costed out. When costs are a little high for a given item the design can be easily modified on paper until the right combination is found.

Tickets and Incentives

The Theodor plant is run on an incentive system. Workers get paid according to the amount of work they do. In the past, as an operator finished each procedure he would record this fact in his daily production log. Collecting, tabulating, and verifying all the logs produced each day by 200 multilingual operators caused a great deal of confusion. The three clerks responsible for collecting this information were always swamped as were the work supervisors, who were called upon whenever there was a disagreement between worker and clerk. Much of this confusion was eliminated by installing a ticket system. This involves providing the worker with a record (in the form of a paper ticket) of each task at the time the task is completed. These tickets, which provide a clear record of each day's production, can be kept by the worker as clear proof of his or her daily effort. The tickets can be turned in at the end of the day, and then easily counted to determine the day's pay.

Conventional ticket systems used by most garment manufacturers involve the use of special ticket machines, and special ticket stock. Theodor uses a PET, disk drive, and printer in the place of the conventional equipment. Over 4,000 tickets are printed each day. No special ticket is required because tickets are printed on the same mailing label sheets commonly used for addressing. Each ticket carries all the identification information for the operation and for the bag style. Also, the ticket contains information regarding the time alloted to the job and the amount of pieces per hour expected for the operation. These tickets travel with the work. Upon completion of the job, an operator peels off the label and pastes it on a structured ticket sheet (also produced by the computer) bearing the name of the operator, which acts as the operator's reporting form.

The data from the ticket sheet is manually entered into the computer at the end of the day. The calculations, to arrive at both the percent performance for each operator, as well as the earned time, are performed automatically by the computer. Each individual's daily performance is printed and posted in the plant.

Warehouse

Theodor uses its third PET to manage its warehouse. With the aid of their PET, Theodor has increased its manufacturing production to such an extent that they began to run out of warehouse space. Initially, they considered building another warehouse, but this was an expensive proposition. A close examination of the warehouse revealed that a great deal of space was wasted through inefficient allocation. Each style of bag was allocated enough space to hold a full stock of that particular bag. At any one time, few of these storage areas were completely full. By allowing the PET to allocate space as needed rather than allocating the maximum space for each style, the problem of half-filled storage space was solved. No longer are specific areas permanently allocated to particular styles. Instead, any bin of any rack can take any style of any color. This is possible because when a load is brought from the factory, the computer directs the loader where to put the load. The PET keeps track of where each load is placed, as well as which areas remain open, and directs placement so that all the bins of one particular style are located as close as possible. When it comes time to pick up an order, the computer directs the operator to the closest bay containing the quantity of bags of the particular style desired. In addition, since the PET keeps track of what came in and what went out, the machine always maintains an accurate, up-to-date inventory. The user can get a hard copy of the inventory any time he wants.

Estimating costs, reporting time, and allocating inventory space – all these tasks are being handled more efficiently with the aid of PET computers. Victor Ardon & Associates believes that PET computers cannot only improve efficiency, but reduce costs as well. Theodor of California is solid proof of that belief. ■

Just can't get the answer to your questions on Commodore Equipment/ Applications? ? ?
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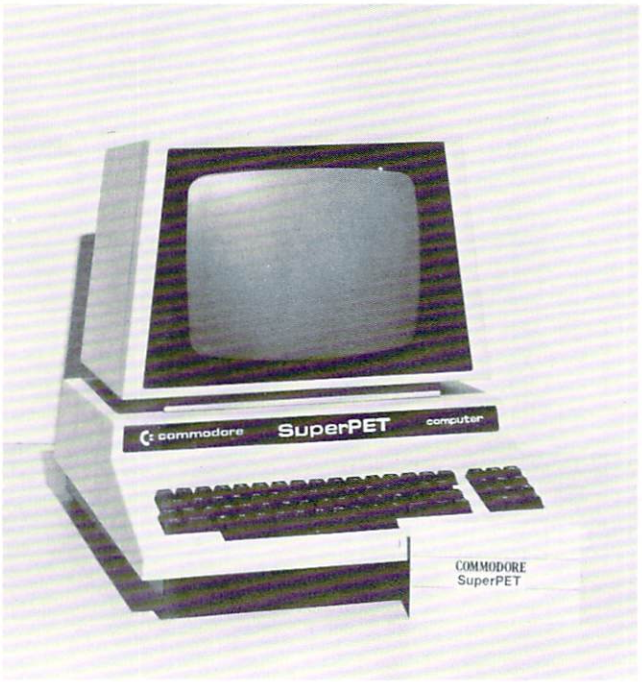
New Product Developement

In the fast paced micro-computer industry, new products are developed at an incredible rate – sometimes too quickly for even the most informed computer person. To do our part in keeping our users abreast of Commodore-related product developments, INTERFACE will introduce a new feature in the next issue of the magazine (September). The sole purpose of the feature will be to announce NEW hardware and software developments. This will be a great opportunity to stimulate user awareness, while taking advantage of free publicity. Please remember that only new product developments will be accepted. If you have a new product that you would like to share with Commodore users, send the information to: New Products, c/o Editor, Commodore INTERFACE, 681 Moore Road, King of Prussia, PA 19406.



Q&A SuperPET

In the May edition of COMMODORE INTERFACE, *a new product called the Micro-Mainframe was announced.*

Although the product is still very much a reality, the name has been changed to SuperPET. Yet, regardless of its name SuperPET is still a computer with mainframe features at a micro price.

Since the product was announced, we have been flooded with enthusiastic inquiries about the SuperPET and its capabilities. Consequently, we have created a list of the most important questions and answers concerning the SuperPET. After reading this list you should have a clearer understanding of Commodore's latest product addition.

SuperPET QUESTIONS AND ANSWERS

1. Just what is this new Commodore product?

The SuperPET is based on the standard 8032 Commodore Business Machine. Incorporating all of the 8032 standard features, this product includes a second integral processor. The add-on processor is a pseudo 16-bit 6809 based system with 36Kb ROM, 96Kb user RAM, and 2Kb screen RAM (134Kb total) that supports all CBM peripherals except the C2N cassette recorder. An RS232-C communication facility supports speeds up to 9600 baud.

2. With two processors, do both run simultaneously?

No. The system in its current configuration can operate only one processor at a time.

3. How does processor selection take place?

Processor selection is determined at power-up by a switch selection.

4. Can the 8032 use the additional memory?

The 6502 processor (the 8032) can address the additional 64Kb RAM. In addition, the 6502 can utilize the RS232-C communication facility. These facilities are available to the machine language programmer. Nevertheless, CBM BASIC will still show 31743 bytes free.

5. Does the 6809 processor use the additional memory?

Yes, the 6809 processor utilizes the additional memory.

6. How does an 8-bit processor address 96Kb RAM when it can only physically address 64K of addresses?

Both the 6502 and the 6809 are basically 8-bit processors. Both processors can address the lower 32Kb RAM and its own ROM. The additional memory is allocated on a "bank switching" scheme. The additional memory (64Kb to 134Kb) is mapped into memory in 4Kb "banks". This switching is under operating system control and is transparent to the end-user.

7. Why didn't Commodore just expand the memory of the 6502?

There are several reasons. By including the second processor (6809) Commodore provides a later generation processor with a more powerful instruction set. It gives the machine language programmer multiple base pages, better stack management, and 16-bit instructions. The 6809 is also compatible to the existing 6502 hardware and peripheral chips. Remember, all current and future 8032 software will run on the expanded product unmodified. Modification will, of course, be necessary to take advantage of the expanded memory available.

8. Which disk drive is required for the SuperPET product?

Any current Commodore dual-disk drive will work. However, the larger capacity drive (8050) is recommended because of language and application storage requirements.

9. Which printers will interface with the SuperPET?

All CBM printers will work. The printers utilize the IEEE-488 interface available on the 8032. Your application or particular environment dictates the required printer.

10. Since Commodore has used the IEEE-488 interface in the past, why has the RS232-C been interfaced?

One of the developers' requirements in using this product was communication to the large-scale mainframe. The product was used as a front-end processor and a device to pass executable program files between the host and this product. It is also possible to use this product as a dumb terminal. By software creation, terminal emulation is possible.

11. Who developed this truly unique microcomputer system?

The hardware implementation of the product was completed by BMB Compuscience and the software was developed by Waterloo Computing Systems, Limited. Both companies are located in Canada.

12. Exactly why was the SuperPET developed?

The University of Waterloo needed to unburden its large mainframe from a crunch of high volume users. There were no existing products that would be cost effective. By developing programs on a microcomputer and having the compatibility of running the same program on a suitably configured host mainframe, many of their educational problems could be solved.

13. What can I do with this product?

This product allows the generation, testing, editing, debugging, and execution of program source files in the interpretive mode. These files may be executed locally or transmitted and executed on a mainframe system utilizing the same language interpreters. Files are stored in true ASCII format for communication and compatibility with host systems.

14. What software packages are available for the SuperPET?

The software packages included with the product consist of interpreters for various languages, an editor, an operating system (supervisor) and an assembly language development system. The languages are portable and are particularly suited to microcomputers, but identical versions are available on medium and large scale systems. Thus a user is not limited by the capacity of the micro; the identical program will run without modification on many of the largest and fastest equipment available today.

15. What languages specifically are available?

There are four language interpreters included with the product. These are Waterloo microBASIC, Waterloo microPascal, Waterloo microFORTRAN, and Waterloo microAPL. These language intrepreters have been designed specifically for teaching computer programming. Their design emphasizes good error diagnosis and debugging capabilities which are very useful in educational and other program development environments. Of course, the standard 8032 BASIC 4.0 is available in the 6502 mode.

16. What is special about the Waterloo microBASIC?

This implementation of BASIC includes ANS minimal BASIC, with certain minor exceptions, and several extensions such as structured programming control, long names for variables and other program entities, character-string manipulations, callable procedures and multi-line functions, sequential and relative file capabilities, integer arithmetic, debugging facilities, and convenient program entry and editing facilities.

17. Is the Waterloo microPascal the same as UCSD Pascal?

These are different implementations. The Waterloo microPascal is an extensive implementation of Pascal, corresponding very closely to draft proposals being produced by the International Standards Organization (ISO) Pascal Committee. The ISO draft language is a refinement of the language originally defined by Wirth, varying only in minor aspects. Sophisticated features such as text file support, pointer variables, and multi-dimensioned arrays are included in this implementation. A significant feature of the Waterloo microPascal is its powerful interactive debugging facility.

18. Does the Waterloo microFORTRAN meet ASCII standards?

The Waterloo microFORTRAN is a special dialect designed for teaching purposes. It has many of the characteristics and much of the flavor of normal FORTRAN, but varies significantly from established standards for that language. This language processor has many of the important characteristics of the Waterloo WATFIV-S compiler, which is widely used on IBM computers, plus some of the features included in the new FORTRAN-77 definition. Examples of the languages features supported are FORMAT, subroutines and functions, multi-dimensioned arrays, extended character-string manipulation, structured programming →

SuperPET Q&A

control, and file input/output. In addition, the interpreter provides a powerful interactive debugging facility.

19. Is the Waterloo microAPL similar to the IBM APL?

The microAPL is intended to be a complete and faithful implementation of the IBM/ACM standard for APL with respect to the syntax and semantics of APL statements, operators and primitive functions, input/output forms, and defined functions. System commands, system variables and system functions are those consistent with a single-user environment. There are no significant design limitations on the rank or shape of arrays or name length. The shared variable processor is omitted. Extensions include system functions supporting files of APL arrays. APL equivalents of BASIC features PEEK, POKE, and SYS are included.

20. To eliminate confusion, the micro languages described above will execute on a mainframe. Is that correct?

Yes, the four languages are the same on both the micro and suitably configured main-frame. For example, if your IBM processor, running VM/CMS, has the proper Waterloo interpreter, application programs may be uploaded or downloaded and executed without any code change. Therefore, the product can act as a standalone processor, as a mainframe system development tool with the available languages and the upload/download/offload capabilities or perhaps both depending upon the user environment.

21. What is the function of the text editor?

The text editor, known as the Waterloo microEditor, is suitable for creating and maintaining both program and source data files. It is a traditional line-oriented text editor with powerful text searching and substitution commands including global change. Full screen support and special function keys allow text to be altered, inserted, or deleted on the screen without entering commands. Facilities for repeating previously issued commands further enhance the usability of this editor.

22. Is the operating system included with this product?

The Waterloo microSUPERVISOR is an operating system designed for the single-user microcomputer environments. It includes a Monitor, Library, and Serial Line Communication support.

The Monitor program supports loading of the Linker produced program files into bank-switched RAM memory or normal RAM memory. The monitor also provides facilities which are useful for debugging machine language programs. These include commands to display and alter RAM memory and 6809 microprocessor registers, utilizing full screen features for ease of use. In addition, a Monitor command permits disassembly of the 6809 instructions into assembly-language mnemonics.

A library of functions is supplied for general use by other programs included in the package. The Library includes support functions for input/output operations to the keyboard, screen, and peripheral devices. Other elements of the Library provide floating-point arithmetic, fundamental trigonometric functions, and several general purpose utility functions.

A Serial Line Setup program is included which provides for the selection of programmable characteristics, such as baud rate. The program includes support for establishing communication with the host computer, through a serial line, for accessing the host's files and peripheral devices.

23. Higher level languages have been discussed, but what assembler or development system is available?

Disk-oriented assembler and linker programs, the Waterloo 6809 Assembler and Linker, are included and support development of general purpose 6809 machine-language programs. The Assembler supports syntax and directives for the 6809 assembly language and includes powerful macro capabilities. In addition, the Assembler supports pseudo opcodes for structured programming controls, long names (labels) for meaningful identification of program segments and data, and the ability to include definitions from separate files. The Assembler produces both a listing and a relocatable object file.

The Linker allows the combination of an arbitrary number of relocatable object files to produce an absolute loadable and executable program file. Since it is disk-oriented, the Linker is capable of building programs which are larger than the RAM space available. The Linker supports building of programs in segments or banks for operation in a bank-switched RAM memory, as well as supporting building of programs for operations in normal RAM memory.

24. What types of documentation will be available?

Commodore will supply a Tutorial Manual and a Language Reference Manual for each of the higher level languages. There will be extensive documentation on the Assembler and Linker included also.

In addition, Reference Manuals, Textbooks, and Instructors' Guides will be available for each software component of the system.

25. What is the price for the SuperPET?

The 8032 and the add-on board, when purchased together as a system, will retail in the U.S. for $1,995.00.

26. When will this product be available?

First deliveries are scheduled for Fall 1981. ■

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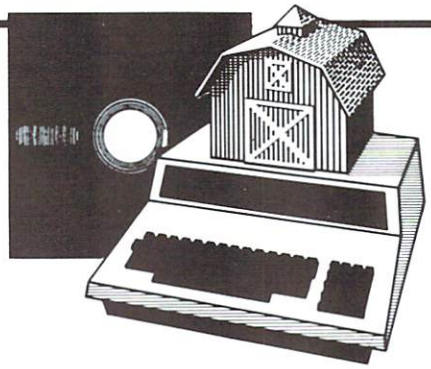

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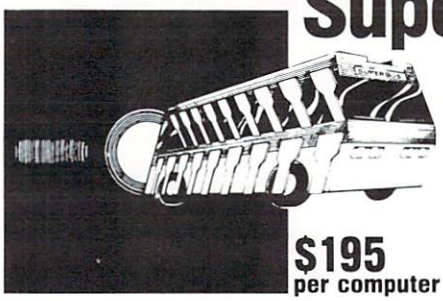

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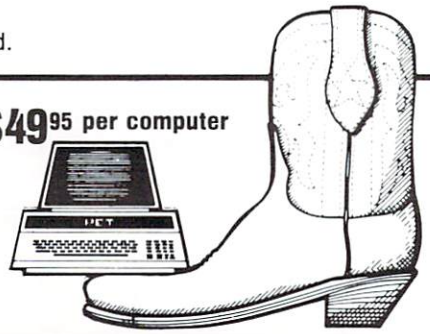

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From our friends in education we have been receiving information regarding the use of PETs in local computer problem solving contests. One such report came from Mr. Kenneth Tong of Ballard High School in Seattle, Washington. Mr. Tong told us that his school district acquired their first PET in 1978. Presently, that number has increased to around 100 and is growing larger each day.

On May 9, 1981, 33 middle school and junior high students from seven schools in the Seattle area participated in the 1981 National Computer Problem Solving Contest at the South Shore Middle School. The contest questions were provided courtesy of Donald T. Piele of the University of Wisconsin-Parkside.

The contest problems required some knowledge of simple number analysis, random number generator, string function, and looping. Most of the participants had one year of exposure to computers. The winning team, which had around three semesters of once-a-week programming experience, solved all five problems within the two-hour time limit.

For your pleasure or perplexity, Mr. Tong has kindly provided the five problems used in the contest. Grab your PET and program, program, program!

The University of Wisconsin—Parkside

May 2, 1981

National Computer Problem Solving Contest

Junior Division

1. Parkside's Triangle

Parkside's Triangle is generated from two numbers – one for the size and another for the seed. For example, here are two of Parkside's Triangles:

Size 6, Seed 1	Size 5, Seed 3
1	3
2 3	4 5
4 5 6	6 7 8
7 8 9 1	9 1 2 3
2 3 4 5 6	4 5 6 7 8
7 8 9 1 2 3	

Your problem is to write a program that will generate Parkside's Triangle given any size N (20) and any seed S (1 S 9). Test your program by generating Parkside's Triangle for N=6, S=1 and N=7, S=9.

2. Round Numbers

A positive integer N is said to be a round number if the binary representation of N has at least as many zeros as ones. For example, 9 is a round number (since its binary representative is 1001) while 26 is not a round number (since its binary representation is 11010).

Write a program which will accept input of a positive integer K, and which will print the number of round numbers less than or equal to K in the format:

THERE ARE XXX ROUND NUMBERS LESS THAN OR EQUAL TO K.

There are 5 round numbers less than or equal to 10. Run your program twice, with inputs of 10 to 100.

3. NFL Helmets

There are 28 football teams in the NFL. Many supermarkets and discount stores have vending machines that dispense miniature team helmets for one quarter (25 cents) each. Assume that all helmets are equally likely to be dispensed by the machines.

You are to write a program to simulate putting quarters in vending machines until all 28 helmets have been obtained. Your output should have the form:

TOTAL SPENT TO GET ALL 28 HELMETS = $XXX.XX.

Run your simulation 3 times.

4. Letter Count

Consider a paragraph containing several lines of text information. You are to write a program to print a letter frequency table which will list the frequency and percentage of occurences of each letter (A through Z) of the text in order of highest frequency first.

Your list should be headed with the line:

LETTER FREQUENCY PERCENT

and should have a final line:

TOTAL XXX

where XXX is the total number of letters in the paragraph. Do not list letters which do not occur in the paragraph. In BASIC, you can use DATA statements to enter your text such as,

1000 DATA "CONSIDER A PARAGRAPH..."

Be sure to convert all lower case letters to capitals. Test your program with the first paragraph of this problem.

5. Missionaries and Cannibals

On a small island in the South Pacific, three missionaries and three cannibals are stranded with only a small boat with which to cross over to the mainland. In planning for the transfer of everyone to the mainland, the missionaries know that they cannot trust the cannibals. Thus, to be safe they establish the rule that missionaries must never be outnumbered by the cannibals on either the island or the mainland during the transfer process.

If we use an M to represent a missionary and a C to represent a cannibal then MMMCCC represents three missionaries and three cannibals together. With this representation, it is possible to list all possible arrangements of missionaries and cannibals on the island and the mainland in a list:

ISLAND	MAINLAND	STATUS
1. MMMCCC		SAFE
2. MMMCC	C	SAFE
3. MMMC	CC	SAFE
4. MMM	CCC	SAFE
5. MMCCC	M	
6. etc.	etc.	etc.

The safe positions are those which obey the rule set up by the missionaries. Your problem is to write a program which will fill out the entire list of possible arrangements of missionaries and cannibals on the island and the mainland and to print 'SAFE' after every arrangement that is safe. The program must do all the work. It is not acceptable to solve it by hand and simply print out the results.

The Summer of '51 – *Harry came home from summer camp with eight multi-colored pot-holders, six popsicle stick renderings of the Empire State Building, and two tiled ash-trays painted in a color you had never seen before. Harry, a child when he left, had hair on his upper lip when he returned. For the next five months, he received 27 letters sprayed with "Evening in Paris" cologne and signed, "Love always, Sheila."*

The Summer of '81 – *This year Harry sent his son Matthew to overnight camp. Matthew will return with the same pot-holders, candy dishes, and lime green ash-trays. He will leave a child and return with a voice several octaves deeper. And for the next five months he'll probably receive 27 envelopes each containing a floppy disk marked, "Love always, Jennifer."*

Summer Camp

Today, it's becoming increasingly common to observe children using computers in educational environments and even at home, but high on a wooded hill overlooking the Connecticut River in East Haddam, Connecticut, youngsters are experiencing the wonders of computers while boating, swimming, hiking, dancing, and singing. These kids are spending two weeks at a summer camp, with a slight twist – computers are the most important part of the fun.

In its first full year of operation, Computer Camp East has captured the minds of youngsters from ten to seventeen who, for two weeks, are exposed to a variety of personal computers and programming languages. Whether complete beginners or advanced enthusiasts, these youngsters can take advantage of the flexible instruction programs available at the camp.

Computer Camp East is the brain child of Dr. Arthur Michaels who, for nearly 20 years, has specialized in education and residential camping. Michaels also operates a camp for learning disabled children and three nursery and preschool centers. According to Michaels, Computer Camp East is an entirely different concept.

"Normally, when you get kids together for two weeks, you're going to have some trouble," said Michaels. "But we have had very few behavioral problems. These kids are pretty well motivated," he said. Michaels explained that although the campers are housed according to age, they are placed in classes according to knowledge and experience. Consequently, there may be an eleven-year old in the same class with a seventeen-year old student. "In fact, one of our most skilled programmers is ten," said Michaels. "Yet, no one seems to mind."

According to camp director Bill Gibson, a vital element of the camp's approach to learning is an emphasis on teamwork. For instance, two students work with one computer as part of a daily "team unit." And up to five campers work together on a project, with each camper having the responsibility for one component of the project.

Computer East provides a program that will interest youngsters at their own level and pace. Instruction is given in popular student languages such as BASIC, LOGO, PILOT, and Pascal. With instruction provided by graduate students, the campers follow a rigid schedule of formal classes and lab sessions. In total, campers spend two-thirds of their day learning about computers or programming. But fun and games are a vital part of any summer camp and Computer East is no exception. Activities such as softball, tennis, boating, and hiking are enjoyed by the campers. And of course, computer games prevail. In the spirit of competition, each camper develops computer games to compete against games developed by other campers. One of the Computer East campers has been developing a program on a PET to play Monopoly.

According to Gibson, the use of PETs is encouraged because "kids would have a better chance of finding PETs in their classrooms when they return to school. We are very pleased with the PET's quality of design and the thought that goes into its configuration," said Gibson. "Plus, it holds up even after being used by fourth graders!" Gibson explained that he did a survey of teachers before choosing equipment for the camp, and most teachers reported that the breakdown rate was much less with PETs.

Summer Camp

In addition to high capacity microcomputers, Computer East provides as wide a variety of computer peripherals as possible. "We want to give these kids as much experience as we can in the two weeks they are here," said Gibson. "So far the reaction has been very, very positive."

Michaels has received almost 2,000 inquiries about the camp, as well as about computer day programs he runs in the Hartford, Boston, and Cape Cod areas. "Few people realize just how many teens are interested in computers," said Michaels.

Michaels said he plans to open another camp in Houston next year, and may provide advanced workshops for students in several east coast cities. Gibson stressed that the main purpose of the computer camp is not to develop professional computer programmers. "We are mainly interested in the cognitive development of the child, however, it is inevitable that most students are likely to develop professional computing skills," Gibson said. Michaels added that "any youngster who becomes computer-literate at a young age really has a head start because most jobs involve computers."

So kids, grab your tennis rackets, fishing rods, mosquito repellent, and programmers guide. It's time to go to summer camp!■

Dear Mom and Dad,

Camp was pretty good today. I almost made a bulls-eye in archery but it was in the white circle, not the black one. It is now rest period so I am writing to you. And we went swimming too. We have the buddy system where you have to have a partner in the water with you at all times and when they blow the whistle you have to hold your buddy's hand with your buddy to prove that you're both OK. And my buddy's name is Robbie and he is a jerk sometimes. Camp is pretty good. Tomorrow we get to play the other bunks and stuff. It is called Color War and I am on the Blue Team and we will win because we have the best counselors on the Blue Team. We had a campfire last night before lights-out and it was pretty good. Well I have to go now because rest period is over now and my counselor Tom is telling us to get ready because we are playing socker now. I'm not homesick but I was in the beginning but not anymore.

Love, your son

Matt

P.S. I forgot to tell you that in computers today we learned how to write programs in machine language code for the PET. Yesterday we did stuff in Pascal and we made multiple regression analyses. Tomorrow we're going to calculate the orbit of Mars until the year 2000 using Pascal.

P.P.S. I did this letter on the PET!

P.P.P.S. Tell Willy I miss him and made him a special water bowl.

WE WANT YOUR FEATURES!

The Commodore Interface is seeking features for use in upcoming issues. If you have developed a program, game or an application that would be of interest to our readers please submit this to:

EDITOR
Commodore Interface
681 Moore Road
King of Prussia, PA 19406

NOW THAT YOUR BUSINESS IS GETTING BIGGER YOU SHOULDN'T HAVE TO WORK HARDER.

Your business is growing. And so are your hours. You're working harder. And longer. And later.

This could only mean one thing. It's time for a computer. The Commodore CBM.

The computer that can help you run your business the way you want to. Fast and efficiently.

Very simply, the CBM can be "customized" to fit your individual needs. Whether your needs are accounts receivable, inventory control, mailing list management, or all three. Commodore can do it. And do it easily.

What's more, Commodore computers are built to grow with your business.

So as you change, we change.

And because Commodore knows how hard you work for your money, our computers go for a very low price. So if you feel like your business is giving you the business, come in and relax.

Take a look at our Commodore CBM computer and see what it can do for you. In no time, we'll have your business running the way you want it. Smoothly.

commodore

VIC 20

Latest Information on the VIC 20 Personal Computer

"The VIC Mystique"
By Michael S. Tomczyk

The "VIC mystique" continues to grow. Here at Commodore we've been literally flooded by requests for information and phone calls to our hotline from would-be VIC owners.

Most of our calls concern requests for information and inquiries on where to buy VICs. It should be noted that the demand for VICs far exceeds the current supply so consider yourself lucky if you get one of the first units. This backlog is expected to continue through Christmas, in spite of the fact that we're gearing up to produce substantial quantities beginning this Fall.

Where to Get VIC Information

The first place to look for current information on the VIC is to contact your local authorized Commodore computer dealer. The salespeople there should be able to tell you when the product will be available, provide you with technical specifications and demonstrate the VIC. Each Commodore dealer has been provided with "Dealer Demo Tape #1" which includes 5 demonstration programs including: a general demo, graphics & sound effects demo, business demo, "flag" demo, and a game called "Rocket Command" which uses programmable characters. These demo programs have been placed in the public domain so dealers and customers can make and circulate copies. . .especially helpful for those who want to use these programs as models to help write their own software in BASIC. Commodore is not providing this tape directly but you should be able to obtain a copy for the cost of the tape or possibly gratis, from your dealer.

You can also get current VIC information from most computer magazines. We've been very gratified by the response from computer and consumer electronics magazines and are working closely with several editors to provide up-to-date information and help them write articles on specific VIC topics. Here's a brief run-down on some recent and/or upcoming VIC articles and where to find them:

BYTE MAGAZINE – May, 1981

COMPUTE! – July, 1981. A new publication called HOME AND EDUCATIONAL COMPUTING! and subtitled, "Resource Magazine for the VIC 20 Personal Computer," will appear as a supplement.

CREATIVE COMPUTING – The VIC will be reviewed in detail in an upcoming issue.

KILOBAUD MICROCOMPUTING – Specific "VIC" articles will appear in KILOBAUD this fall.

PERSONAL COMPUTING – Sept., 1981.

POPULAR COMPUTING – Fall, 1981.

POPULAR ELECTRONICS – Fall, 1981.

This, in a nutshell, will give you some places to start looking for current VIC articles. If you need further information you can drop a note to us in care of the VIC Product Group and we'll send you a copy of our "VIC News Brochure" which describes most aspects of The VIC.■

Interested in Writing Software for the VIC 20?

Commodore's product development team recently identified several software houses and independent authors who will be invited to work with Commodore's VIC Product Group on the development of VIC 20 software. These programmers will be provided with Commodore's proprietary VIC Cartridge Development System, which allows them to write 8K-16K machine code programs on the PET/CBM (in assembly language) for use on the VIC 20. Commodore will convert these programs to ROM and market them on cartridge internationally. We are currently screening programmers and pinning down exclusive royalty agreements for selected programs which will fit into a Commodore VIC Cartridge Library. Program subjects range from innovative games (only the best!) to personal budget, home tax preparation, business/calculation and educational programs. The VIC's use of color, sound and programmable characters makes the prospect of writing VIC programs not only profitable but fun! For more information send your written proposal letter outlining the specifics to VIC Software Director, VIC Product Team, 681 Moore Road, King of Prussia, PA 19406.■

VIC-20

GAMES

RECREATION

6 Games on Tape for the Commodore VIC 20

By Duane Later

The VIC-20 Personal Computer, the world's first full-featured color computer, will offer the following types of programs on cartridges and tapes:

1) Games and Recreation
2) Education
3) Business & Calculation
4) Home Utility
5) Computing Aids

The first VIC 20 programs from Commodore include 6 games available on tape. Users will need a Commodore cassette unit for these tapes, which are priced at only $9.95 each.

Car Chase

One of the best of these games is titled "Car Chase." This is very similar to the arcade game Head-On. Your car races around a square playing field divided into four lanes, trying to score points by driving over dots. Another car controlled by the computer drives in the opposite direction attempting to collide with your car. You are allowed three collisions before the game ends. When all dots have been eliminated from the screen, you are awarded a bonus 100 points and a new set of dots appears. If you succeed in eliminating two screens full of dots, and there are less than 10 dots left on the third screen, the dots will turn into diamonds as the computer-controlled car runs over them, and you will be awarded extra points for each diamond you run over. This game is very difficult to master and should provide many hours of playing fun.

Blue Meanies

"Blue Meanies from Outer Space" is a game which should prove especially popular with children. The player fires laser beams at a series of block-headed, blue-colored bad guys who attack your battleship and attempt to hit your power cells. Points are obtained by hitting the blue meanies with your lasers. You also control a repair robot which you can use to fix the holes in your battleship. Periodically, a supply ship comes down and refuels your ship with energy, allowing the battle to continue. Be prudent with your use of laser and the repair robot, otherwise you will run out of energy and be unable to defend yourself against the meanies until the supply ship comes again! The game uses programmable characters especially well, and should prove a favorite with many.

Space Math

A good education/recreation game is "Space Math," intended to help teach primary school children multiplication, addition, subtraction, and division. The game player →

must defend his space ship "the U.S.S. Victory" by correctly answering a math problem contained within an enemy torpedo traveling towards the space ship. The player has as many chances as needed to answer the problem, but if he fails and the ship is hit, points are deducted from the total score! This game should be a favorite with parents and teachers as well as students, and is the first of several "math improvement" games which will be provided by Commodore for use on the VIC 20.

Slither/Super Slither

Other exciting games are "Slither" and "Super Slither." The player directs the path of a worm towards a series of randomly appearing colored blocks containing a point value. If the slithering worm hits the block, the points contained in the block are added to the total score. The tail of the slithering creature grows with each successful "hit" making it more challenging to hit the next block! Super Slither puts several colored blocks on the screen simultaneously, as opposed to the single block Slither puts on the screen. Betcha can't get over 100 points!!!

Biorhythm Compatibility

"Biorythm Compatibility" is the classic biorythm plotting program but with an interesting twist – the biorythms of 2 people can be compared to ascertain compatibility! Very popular around the office! You can plot forward from any date to determine your physical, intellectual and emotional biorythm level.

VIC-21

"VIC-21" is Blackjack casino-style for 1 or 2 players. This game provides hours of casino-style card playing fun for Blackjack enthusiasts. The game accommodates 1 or 2 players and includes such features as splitting and doubling down. . .features which many more expensive Blackjack games don't offer. A most enjoyable game.

INTERVIEW...

"... the automobile when it was first introduced was considered a disaster by many people. It scared horses, made lots of noise, made these terrible smells, and it used to fall apart all the time. So anybody who had an automobile was really thought to be some kind of a nut."

AN INTERVIEW WITH JACK NILLES ON MICROTECHNOLOGY.

Jack Nilles is the Director of Interdisciplinary Programs at the University of Southern California. Since 1972, Nilles has been developing a series of research programs designed to interpret the effects of technology on the world—not an easy day's work.

Prior to USC, Nilles, whose education was in physics, designed spacecraft for the Air Force. After leaving the service, he worked in the aerospace industry, mostly in preliminary design of satellite systems. Nilles became fascinated with the effects of technology on world progress and began to develop programs in that area.

Nilles decided that to find the right answers he needed to get experts in business, political science, communications, etc. According to Nilles, "These people are generally not available at a typical engineering firm. They are available at universities. So I came to USC."

Nilles considers one of his primary successes to be a study he did in the early seventies called "Telecommuting."

It was on this topic of computers and personal computing that Nilles directed his comments during an interview.

What do you consider your successes?

Well, we did a study on a topic I call "telecommuting," which is the substitution of telecommunication and computers for the commute to work, working at home or near homes using computer technology. Computers at their present state of evolution are still pretty dumb beasts. They do well-defined things very quickly. That's mainly what they're about. As long as they are told what you want to have done, step-by-step, and often in agonizing detail, they will do it faithfully. They do dull, routine jobs very fast. Primarily, that has been their use in business, science, whatever. In business, they're used to prepare bills. Imagine the 19th century job of a clerk in a large store, sitting at a desk all day performing a specific function. Now, a machine can go through that information and ZIP!, you have it all together. That's the kind of thing they're good for. In scientific applications, they do tedious calculations that you would never be able to do by hand. And with a calculator you'd wear your fingers out. Combined with telecommunications technology, computers can do these routine jobs independent of their location.

So the clerk in the future might not drive to a desk, he might just plug in his personal computer and send that information to the corporation at the end of the day, or instantly.

That's right.

But you still need the human factor.

Oh absolutely. The main purpose of the computer is to help get rid of drudgery and free the human for doing creative sorts of things —making relationships between what appear superficially to be unrelated. Computers are very poor at that generally.

Will that ever change?

Possibly. Certainly, a lot of effort is being put into a field called artifical intelligence, the objective of which is to get the computers to exhibit imaginative tendencies, or think for themselves, or even program themselves. But it's a very slow process. The most interesting thing researchers seem to be finding out as they try to get computers to do these things, is how complex human thought really is.

What sort of projects are you involved in now?

We've just completed a project on the impact of personal computers, which has gathered a lot of attention. It was published here as a report, and the research was supported by the National Science Foundation.

What were some of the results?

Well, from the point of view of the manufacturer of a personal computer, I think it is safe to say they're certainly going to be around for awhile, and probably in large numbers. So far, the industry seems to be following tradition closely. When a new technology is introduced, it is adopted first by people who already have expertise in the field. In this case, it would be people who already know how to program a computer, because that's part of their job. Secondly, hobbyists who say, "Hey, I just like to play with this machinery. I don't care if it does anything, but it's really fun dithering all these gadgets around." Finally, there is the person who just likes to be the first on the block to have whatever is out on the market. If the technology is to succeed, what happens next is that the knowledgeable people are barraged by questions from their colleagues, neighbors, and acquaintances, who say, "Okay, but what does this really do? What can I do with it?" Ultimately, the manufacturers start to put together "friendlier" versions of the product. For example, the automobile when it was first introduced was considered a disaster by many people. It scared horses, made lots of noise, made these terrible smells, and it used to fall apart all the time. So anybody who had an automobile was really thought to be some kind of a nut. Anybody who has a computer now is also some kind of nut. Or at least they were a few years ago. The nuts slowly massage this thing, and they yell at the manufacturers, and the technology becomes more and more adaptable to the needs of a greater number of people, who require increasingly less sophistication in order to operate the product. The number of people using them continually grows. And that's the way it all seems to happen.

Are we getting to the point where we can actually voice operate certain computers?

Well, voice operation is a very complex thing. You can buy a computer you can speak to with maybe 50, 60 or 100 words, after you train it. But you have to speak very distinctly. If you change your tone, or the pattern of your words, it'll fail to understand you entirely. So it takes awhile, and it's hard to develop. I don't foresee a computer you can talk to fluidly for at least a decade, probably longer. It's easy to make a computer that talks because you know what the computer is supposed to say. Therefore, you can write software that tells it to do these things. On the other hand, if you were talking to the computer, it has no prior notion of what you're going to say to it. So it's got this whole universe of possibilities, and you come at it with some word that says, "xzgyi!" What does it do with that? It crashes. A large portion of your brain is devoted to decoding speech.

Are you familiar with Commodore's new SuperPET product? It gives you the ability to program in four languages and the machine will sell for approximately $1995.

No, I'm not familiar with it, but $2000 gets my attention.

They're using it for educational development, so that should be up your alley too.

Interesting, it has BASIC, FORTRAN, PASCAL, and APL. Good grief! I think it's important for any computer to have a number of languages available for it.

And they're developing COBOL for it too.

You know the computer world is filled with acronyms. FORTRAN stands for formula translation.

So that would be physics?

Yes, FORTRAN is what's known in the trade as a number cruncher language. It's great for grinding out huge quantities of calculations, so its very popular in the scientific community. In fact, it's essentially the common language.

Not BASIC?

Well, BASIC was developed at Dartmouth University in the mid-sixties to teach computer literacy to its students. And its main feature is that it's very easy to learn at first. It has some drawbacks though, which makes it, at least the original version, less desirable.

Could you provide an example?

Well, there are some stylistic problems. BASIC allows you to write a program any way you wish, and it will still manage to lurch through somehow and come up with answers. That is okay if you are the only one who is going to use the program, and if you have a fantastic memory. The problem is that you may come back to a program two years later and you don't remember what this formless sequence of statements means. It lacks structure, and the current rage in the programming ranks is to have structured programming. Simply, that means you do specific things in specific places so that it's easy to remember what you were doing when you come back to it. It's easy to transfer a piece of code from one program to another, building up large programs as collections of coherent pieces of smaller ones.

What language would you recommend for structured programming?

The language that really typifies this structured programming trend is PASCAL. However, the best advice I can give someone who wants to seriously become a computer professional is to learn several languages. No language is perfect at everything.

Is COBOL designed to supersede all of these languages?

COBOL is an acronym for Common Business Oriented Language, and it's great at producing reports, ledgers, accounts payable, accounts receivable, inventory, and other types of business information. COBOL programs account for the majority of computer time used in the U.S. today.

I can hear a very busy corporate executive say, "I'm 50 years old, I missed the move to computers, I've got to know about them, but I don't have time to learn one language let alone four." What would you say to him?

I would say you have to face the fact that you WILL learn to interact with computers. For one thing, it depends on the size of the business. You can buy packages now that are becoming reasonably sophisticated for small to medium sized businesses. You see the easy part in the computer business is the hardware. You can get competent hardware from a variety of different manufacturers. The critical part is the software, because the machine is an inert device unless it's got the records to play.

So a machine like the SuperPET might be beneficial because you can feed anything to it.

Yes. You've got PASCAL, FORTRAN, and BASIC. APL is another one. APL is a very condensed symbolic language. It has a small but fanatic following.

Among scientists and developers I presume?

Yes. APL is characterized not entirely jokingly as a "write only" language. It is a highly condensed symbolic language. It's one of these types where you review a program six months later, even if you're the original author, and say, "What's this?" The symbols do really powerful things, but you can't remember what they were supposed to mean.

So you can't retrieve it properly.

You get lazy programmers. They're interested in producing code, not in making it understandable to someone else. That's a problem with many of the languages actually. The reason there has been a move toward structured language is that you have to follow certain rules to get the program to run. For example, with PASCAL, you have to first declare what the program is about and what types of variables you are going to use, and then you follow certain patterns to do various things with the program. If you go outside one of those patterns, the program becomes fairly incomprehensible. Further, in PASCAL, in FORTRAN, and in some of the more advanced forms of BASIC, the variables used to establish relationships have comprehensible names instead of incomprehensible letters. For example, instead of "E", you would use "EMPLOY NUM" for the variable representing employee number.

You do a lot of work with business men. Do you try to develop computer applications for them, or beyond that?

We're more into the research of what's going to happen as businesses use their equipment. What are the good and bad effects? What happens to the economy, etc. However, we often give advice to businesses regarding how to really use a computer.

Is there still a lot of union reticence about computers? I remember when I worked for a large newspaper in the sixties. They were trying to get composing machines into the newsroom, and the union went on strike because of that.

It didn't work because they're in there now.

Do people in business still think computers are going to throw employees out in the street without a job?

Oh I'm sure they do, no question. They do throw some people out on the street. They certainly have done it to typesetters. They're likely to do it to a large number of data entry clerks. The question is not whether people become unemployed, because they do whenever any new technology enters society. The real question is can they be employed elsewhere? Is their's a temporary dislocation, or are they in serious longterm trouble.

So that involves retraining.

That's correct.

Who has the responsibility of retraining these people? Is it the corporations that dismissed them or the colleges who are training workers for society?

I don't know. That's sort of a political question. Who's responsible for that? In the U.S. the answer generally has been nobody. The government has an uneven but mostly miserable history of providing retraining programs for unemployed people.

Is the government finger-pointing and saying it's somebody else's responsibility?

I would expect them to say that the federal funds will be provided for certain forms of retraining programs. But generally, the responsibility is with the local community, through unemployment benefits. Unfortunately, benefits do not specifically involve retraining. Practically, it's the burden of the individual to retrain himself or herself. That's the way it works out regardless of the finger-pointing. The finger-pointing tends to go around in a circle with the unemployed person in the middle.

When you talk to high level executives who are generally older, there is no question in their minds that the future lies in computers. Who is the responsible party for the dissemination of information about computers?

The market.

Now that is everybody, isn't it? The manufacturers, the sellers, the colleges, the individual users . . . everybody. Not one person or group more than any other?

Well, I would say in this particular industry it's a case of what the economists call a supply push. In other words, here's this new capability, let's find something we can tell people they need it for. So, it's incumbent on manufacturers to convince prospective computer buyers that it will do useful things for them. It's my position that our research program should point out both sides. Here's why you should have a computer, and here's why you shouldn't; or at least here's what to look out for.

When do you tell people not to buy a computer?

When the function that they intend to have the computer perform is clearly inappropriate either for the computer they are trying to use, or is inappropriate for any computer. It's often a question of the relative advantage that alternatives are going to give you in your business. For example, you're a medium-sized company and you're having inventory problems. You've got one clerk who can type adequately, but can't keep track of anything. Then you might be better off getting a computer to keep track of the inventory and to give you a daily printout of what you've got in the store. One of the consultants working for us has developed a program, using Commodore equipment, to keep track of the piecework for some garment industry firms. With the old method, as patterns were cut, each piece got a tag attached to it. When these pieces were sewn together, the person doing the work would remove the tag. At the end of the day, the employee would turn in the tags, which were an indication of a day's work. Well this system was fraught with all sorts of difficulties. People would lose tags. Or the clerk responsible for keeping track of the tags would calculate the figures incorrectly. Employees would save tags if they had a good day, and use them the next day if they slacked off in their work. Well, they programmed a Commodore to handle the ticket counting.

You can't bribe a computer can you?

That's exactly right. That's the point. As the day ends and the workers turn in their tags, the clerk just pastes up all those tags on a board and zip, zip, zip—all the numbers are entered into the computer. They know who did how much because the computer instantly produces a report of the work performed that day. Furthermore, the computer produces an instant breakdown of who performed each task and how quickly. The owner now has information never before available. And further, they tested this system using the shop foreman and the union management. They said, "Okay, Mr. Foreman, try and confuse the machine." And it couldn't be done. It turned out the machine was honest. Neither side trusted each other, but they both trusted the machine. Labor relations improved, morale went up, production increased, and there was better control over inventory. There was also less fluctuation in output because if employees kept tags to turn in the next day, they couldn't get away with it.

It'll go tilt!

"Hey, where's his tag!" It's this kind of a situation where computers can act as very useful and very inexpensive tools.

Allow me to play the role of layman. I would love to learn about computers so I pick up a computer magazine and see hundreds and hundreds of conflicting pages. Where do I go? What does the total novice do to start learning about computers? How does he make a decision about which language to study?

The first thing is the language. Although, once you learn one language, it's not that difficult to learn another.

Like French related to Spanish or Italian?

That's right. It's almost like a Spanish-Italian correlation. There are more cognates between Spanish and Italian than between either of them or French. You begin to see common structures in all of these things.

So how do you make up your mind to study one language as opposed to another?

You just start with one. Enough of this agonizing. Go right to it.

How long does it take to learn BASIC for the average person?

To learn enough to write a coherent program may take a couple of hours.

That's all! In other words, a person could go to a night course, and come home the same evening and program a computer. Is it that simple?

The problem tends to be the inverse. Once people have their toe in the water, you can't get them out. The big hook is the computer game, which immediately involves you in all sorts of fascinating things you can do. And you don't really have to know how to program to do it. One insidious way of learning is to get the game for which you have the program and learn how to play the game. Then, try changing parts of the program and observe what happens to the game. If it's a game of any breadth at all, you'll soon be able to teach yourself some of the things that go on in a computer program. The nice thing about a personal computer is that it can be used in the privacy of your home. If you make a mistake, nobody is watching and saying, "Oh, look at that idiot."

What is the most needed kind of software to make the market grow?

Well, I think the most crucial point is making the initial step a lot easier for people. It is difficult to write software that can be immediately used by someone who knows nothing about computers. The typical approach in the business world is that you write menu programs, which allow the operator to view a menu of options. You don't see the BASIC or FORTRAN or PASCAL or COBOL. What you see is what the program tells the computer to print on the screen. The program leads you step-by-step until an acceptable result is produced. And you don't have to know anything about programming. You do need programming knowledge when you don't get the option you want. Then, you have to be able to get in there and tweak it around so that it performs correctly. Frequently, for a businessman the agonizing decision is whether he should hire somebody to do the programming; learn it himself; or have one of his employees learn. If he chooses to train an employee, he is sacrificing the time that person could be doing something else, and he's leaving in the hands of an employee some control of his business. His only other choice is to modify the business to conform to the available software.

We're 19 years from the twenty-first century. What's it going to be like in the year 2000? How different will your office look 19 years from now?

For one thing, it's not likely to be here.

Instead in your home? And you could do anything you need to do there?

Yes, mostly.

That's one answer to the gas crisis, isn't it?

Absolutely. I see an increasing number of situations in which a business will keep offices in various sections of town, that are of the conference room variety. The conference rooms would be used when face to face contact is required. And the few available offices would be shared by employees who spend a fairly substantial amount of time at home.

Does this mean that if you were a major corporation thinking about building an office complex, the concept might be obsolete in 20 years?

That's right. But now there are various motivations for having a large office building, not the least of which is that it has your name on it. It's what one of my researchers call the "Edifice Complex."

If you could say anything that you wanted to corporation executives who haven't gotten on the computer bandwagon, what would it be?

Well, I'd say that in order to survive in the world ten years from now, you are going to have to computerize many of your operations just to increase productivity. That's the only way it's going to happen. We have enough problems with manufacturing productivity yet, productivity in the United States is at least as high as most countries, with the exception of some segments of Japan and Western Europe. But in the information sector, which now comprises half the labor force, productivity is at best steady, and more likely lagging. Now one way to improve this situation is to incorporate computers. That has to be done very carefully. One of the things we advise people is that computers can hurt you as much as they can help you. If you have lots of non-compatible computers all over the place, all doing their thing—and often the wrong thing—you can have serious problems. But the fundamental point still is: there will be firms who will make good use of these computers; who do increase their productivity; who do manage and organize properly. And these firms will be ahead of you if you're in the same industry. They're going to be more efficient in their operations.

How long before it shakes down?

Twenty years. Turn of the century.

And of course, there's room in there for that advance none of us knows about, which is bound to happen in the next 10 or 15 years.

Sure. Even with the SuperPET. The capability of the hardware is well beyond our ability to deal with it, in terms of using it properly. And the power of hardware is increasing, and still is, at about 28 percent a year. In turn, the number of things it can do. The magnitude of problems it can handle.

Are there any books you recommend to the novice when they ask you what to do about studying computers?

Yes. There's a book on BASIC called "BASIC And The Personal Computer" by Thomas A. Dwyer and Margot Critchfield. It's a good introduction because it takes you step-by-step. It tells you enough about what's in the machine to keep you alive and happy.

So summing up your advice, like the mother to the new baby who's trying to swim, "Just jump in and start doing it."

Absolutely. Any of the books on "how to" are an adjunct to your own experience.

The Jack Nilles interview was conducted by Roger Steffens, a Los Angeles-based free-lance writer.

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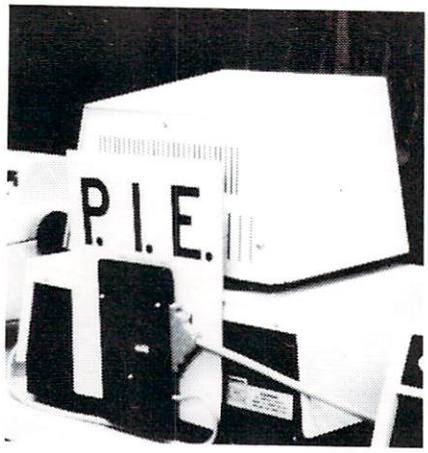

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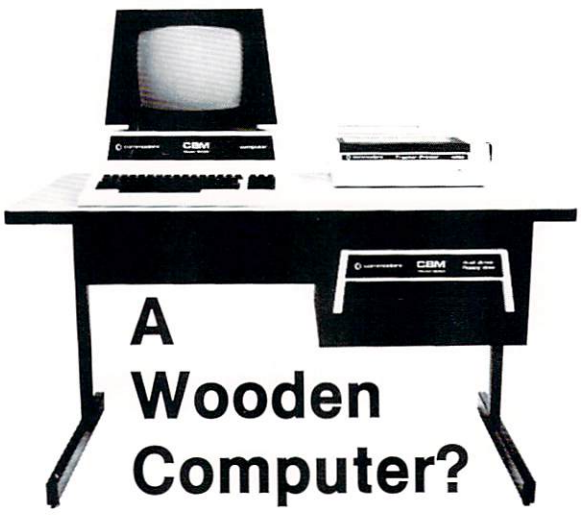

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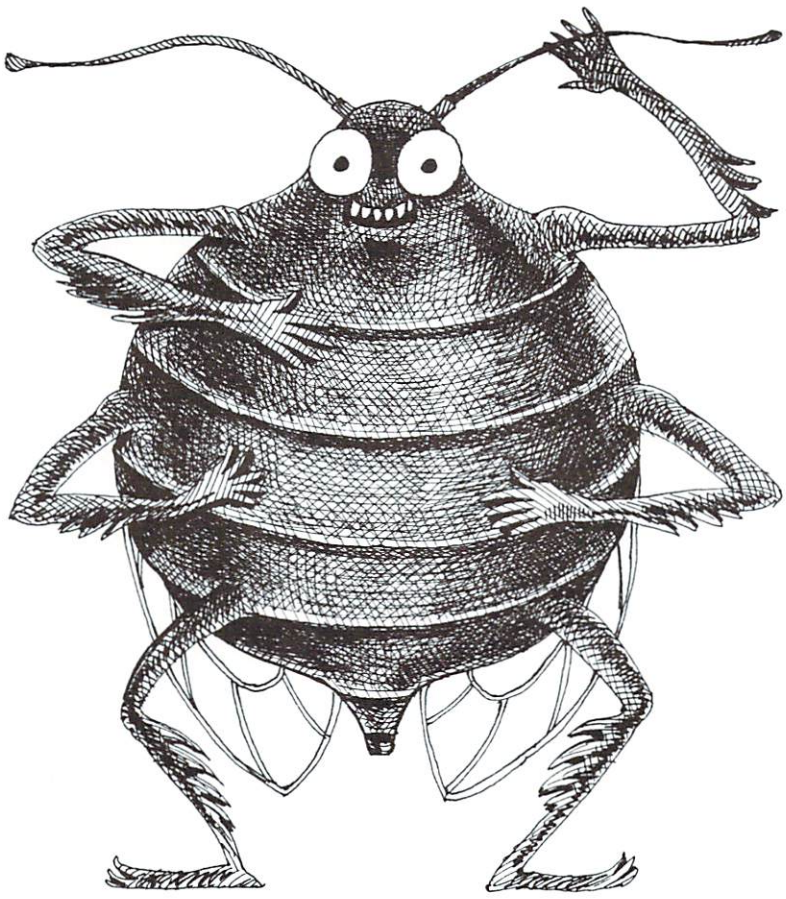

How to Learn Debugging

by Elizabeth Deal

There is no better way to learn debugging programs than by using them. It's easier than swatting flies, which move rapidly and just out of reach. Program bugs are usually all over the place but stand still waiting to be recognized.

By examining this short, do nothing, routine and by trying to write variations of it you may pick up some methods that can be helpful. Can you figure out what the program does, more or less? Do DATA items give you any clues? Do variables S1 and S2 tell anything? Imagine that this is a program you wrote five years ago, and didn't document. How will you go about finding out exactly what it does?

What goes into the program? Usually the "in" statements will be READ, INPUT, INPUT#, GET and PEEK. What comes out? The statements that put things out are PRINT, PRINT#, and some POKE commands.

You should be able to see that what comes in once is nine pairs of values from the DATA lines, and that these values are used, in some fashion, in a loop in lines 590 to 680. That loop also contains a GET command which brings in K$. There is a relationship between K$ and K. Can you see the relationship of K to the nine pairs of values that were READ in? Can you find the connection between S1, K and the nine pairs? What does the program do to those values taken one at a time? Are there special situations that are handled? How? Why?

Whatever your score at the moment, type this thing in. There are no bugs in it if it looks like a copy of a printout. SAVE it after typing, please. You may lose control of the Pet if you typed things wrong, and I am not telling why. After VERIFYing, type RUN. Press some keys, see what happens. If nothing happens after all keys were pressed and if the STOP key does not work, you've crashed and will have to reset the Pet, LOAD the program in, and double check things, specifically lines 550 and 630.

After the routine functions again, see if it does exactly what you thought it would do. Why or why not? Try some variations on the main theme. But do NOT delete line 550 and do NOT delete line 620. Do not change them until everything is saved and you understand what is happening. Why do these lines have to be right? Hint: consult memory maps.

Here is a list of several changes you may try for exercise. Do them one at a time restoring the program to the original shape between the changes. Take notes about the difference being important or unimportant. Is there a difference at all?

(1) Change value of G

(2) Eliminate 'POKEP, B' in line 590

(3) Change S1 to be 32848 and S2 to be 33687. Stay within the original S1 and S2 boundaries. Why?

(4) Add line '631 GOTO590' and ask: will the program go to line 640? Sometimes? Always? Never? What is the effect of this change? Would you consider this to be a minor or a major change in the logic of a program? How can you use this information?

(5) Substitute lines 650 and 660 with one line:

661 MP=CP−S1+SB*(XD(K)=DD)

What happens? A hint: Pet returns value of −1 (minus one) if an expression is true, and a value of zero when an expression is false.

(6) Add line '621 PRINTCP;'. What will come out? Where will it print? Did it print exactly where you thought it would? Why or why not?

(7) Change line 600 to be:

→

600 GETK$:IFK$=""GOTO 600
What happens? Exactly why? How does this relate to K and the nine pairs?

(8) What will happen if in line 570 you said P=S1+499? How about P=S1+40? How about P=52–39? A hint: in the last instance you may need to make major modifications to get the logic back. Try it.

(9) Add line '571 K=5' and change line 610 to be:
610 IFK$()""THENK=VAL(KS)
Any effect? Why or why not? Delete line 571 for a moment. What happens? Why? Put it back now.

(10) Keep changes proposed in point 9 and add this line:
611 DL=20:FORJ=1TODL:NEXTJ
Fool around with different DL value.

(11) Add change proposed in point 2 to the modifications made in points 9 and 10 and see what comes out.

(12) Rewrite lines 550-560 to work on the 80-column CBM.

Think about this. Some of these changes might have been needed to be made in response to a functioning program with a logical error in it. The syntax was always correct, but the program might not have been doing what you intended it to do. I can't prove it, but it is common knowledge that the amount of trouble increases as the square of the length of the program. You can learn how to handle trouble on short routines by figuring out how your Pet thinks.

A very valuable tool for debugging is a Palo-Alto ICs Programmer's TOOLKIT chip.

REFERENCES: Memory maps written and published by Jim Butterfield in **COMPUTE**, issues #1 and #7. 'Pet Revealed' by Nick Hampshire contains Jim's maps for original and upgrade ROMs. Also in Donahue-Enger and Osborne-Donahue Pet guides. Basic 4.0 map is mangled and/or missing in the last reference. Basic 2 map (for upgrade ROMs) is all right.

Elizabeth Deal is a Malvern, Pa. -based free-lance writer whose work frequently appears in COMPUTE! ■

```
500 REM----------------------------------------
510 REM SCREEN EXERCISES
520 REM----------------------------------------
530 DIMXD(9),YD(9)
540 FORK=1TO9:READXD(K),YD(K):NEXT
550 S1=32768:S2=S1+999
560 G=93:B=32:MT=40:SB=39:DD=-1
570 P=S1:CP=P:PRINT"□";
580 :
590 POKEP,B:POKECP,G:P=CP
600 GETK$
610 K=VAL(K$)
620 CP=CP+XD(K)+MT*YD(K)
630 IF(CP<S1)OR(CP>S2)THENCP=P:GOTO590
640 IFXD(K)=0GOTO590
650 MP=CP-S1
660 IFXD(K)=DDTHENMP=MP-SB
670 IFMP/MT=INT(MP/MT)THENCP=P
680 GOTO590
690 :
700 DATA -1,1,  0, 1, 1, 1, -1, 0, 0,0
710 DATA  1,0, -1,-1, 0,-1,  1,-1
720 REM----------------------------------------
READY.
```

Two Tape and Disk File Hints

By Elizabeth Deal

Buttons Up, Please

Children, cats, and confused programmers can sometimes mangle the operation of the best program. One needs to provide some protection in such programs. This article will describe a way that will make tape input and output a bit safer.

When you plan to read previously written records from tape, a program usually instructs to PRESS PLAY ON TAPE #1. But what if you have just rewound the tape and left the rewind button down? Nothing will be read. What if play and record buttons are down? The tape will get scratched. This type of thing does not happen often. But it is a good idea to prevent such mishaps. It's quick and simple. All it takes is a check to see if the tape recorder buttons are up or down before permitting any planned tape activity within a program.

The program I will describe does just that. Its main section, lines 140-400, contains "write tape" and a "read tape" segments. Before beginning either one we'll check if the buttons are up by use of a short routine in lines 460-470. This subroutine checks the value in memory location 249 (for tape #2 we check location 250). If the value is zero, Pet detects that all buttons are up and the program can go on. Otherwise the program waits for the user to make a concious evaluation of what is supposed to be done. The user signals being ready by pressing the RETURN key to continue work.

Close Files

A somewhat related issue is one of closing files. What if you run out of tape during a recording? What if someone moves the recorder buttons up? What if you are writing both tape and disk records? What if you are reading tape and copying records to disk by PRINT#20,V$ in line 365 and something happens that stops the program? This could happen many times during the program development stage.

Comparatively little damage is done to the tape. At worst, one file is incomplete and not closed. It has no effect on other files on the same tape in the event that such exist. It could be an entirely different story with disk. If a file is not properly closed by the program or the user in direct mode, you might lose access to all files on the disk. It is unlikely, but as I study Commodore's disk book, specifically the section on pointers, I think it could happen.

Perhaps we can prevent trouble. I propose use of lines 490-520 as a possible solution. I am not 100% sure that the solution covers all pitfalls nor that it is, in fact, a 100% solution. Thus, it is submitted for discussion.

What I am trying to do is to have the PET forget that tape file was ever opened, simply by killing it. No need to try to close it – there is no room on the tape, or the tape buttons have been moved up and the tape useless anyway. Killing the file just eliminates it from PET's list of open files. This is done in line 500.

The disk part seems a bit more complicated. An unclosed read-file is no problem, but a write-file must be closed. Instead of looking for file numbers in some big program, I am trying to have the PET do the work. After eliminating tape file from existence, the PET scans the list of open files and closes them all, one by one. This is done in line 510 and seems to work for me.

If a program is stopped by a STOP key during any input/output activity or an error condition within the program, the files can be closed by direct command, GOTO510. This or another version of this procedure ought to do the job 100%.

This program should work in the upgrade and 4.0 ROMs. I am unable to confirm a "how many files open" location for the original ROMs. It is needed for variable F1. The parameters for line 150 seem to be:
T1=519:T2=520:F1=610:F2=239.

REFERENCES:
(1) Jim Butterfield, Basic 4.0 Memory Map, COMPUTE!, Nov-Dec. 1980, #7
(2) Nick Hampshire, Pet Revealed – distr. by Commodore.

Elizabeth Deal is a Malvern, Pa. -based free-lance writer whose work frequently appears in COMPUTE!. ■


```
100 REM--------------------------------
110 REM TAPE FILE DEMONSTRATION
120 REM UPGRADE AND 4.0
130 REM--------------------------------
140 :
150 T1=249:T2=250:F1=174:F2=210:F3=593
160 :
170 P1=1:P2=1:P3=1:NF$="BUTTONS"
180 GOSUB460:OPENP1,P2,P3,NF$
190 :
200 REM WRITE 20 RECORDS ON TAPE...
210 :
220 FORJ=1TO20
230 V$="RECORD #"+STR$(J)
240 PRINT#P1,V$ : PRINTV$
260 NEXTJ:CLOSEP1
270 :
280 REM ..AND READ BACK TO END OF FILE
290 REM WITHOUT USING LOOP
300 REM LOOP CAN BE USED IF YOU KNOW
310 REM NUMBER OF RECORDS YOU WROTE
320 :
330 PRINT"REWIND TAPE":GOSUB420
340 P1=2:P3=0
350 GOSUB460:OPENP1,P2,P3,NF$
360 GOSUB490:INPUT#P1,V$:S=ST:PRINTV$
370 IFS<>64GOTO360
380 CLOSEP1
390 END
400 :
410 REM--------------------------------
420 FORJ=0TO9:GETR$:NEXT:PRINT"PRESS
      ■RETURN■ WHEN READY"
430 GETR$:IFR$<>CHR$(13)GOTO430
440 RETURN
450 REM--------------------------------
460 IFPEEK(T1)<>0THENPRINT:PRINT"TAPE
      ■BUTTONS UP■, PLEASE":GOSUB420:GOTO460
470 RETURN
480 REM--------------------------------
490 IFPEEK(T1)<>0THENRETURN
500 POKEF3+PEEK(F1)-1,255:POKEF1,PEEK(F1)-1
510 FORF5=PEEK(F1)-1TO0STEP-1:CLOSE(PEEK(F3+F5))
      :POKEF5+F3,255:NEXT:POKEF2,0
520 PRINT"***BIG MESS, CLOSED ALL FILES***":END
530 REM--------------------------------
READY.
```

The Relative Record File System

Reprinted from the "TRANSACTOR"
by Karl Hildon

Built in to the new DOS 2.0 is a filing system known as The Relative Record System. It's called Relative Record because each record is relative to another.

When a relative file (type REL on directory) is created, each record will have the same byte length. The length of the records are chosen by the user and can be any length between 1 and 254. No bytes are wasted which means, in most cases, records will span sector boundaries.

Essentially, a REL file is like an SEQ file with entry points. These entry points are stored in "side sectors" which take up space on the disk, but are transparent to the user. Each side sector can handle up to 30K with a maximum of 6 side sectors. This limits REL files to 180K, but since 2040 diskettes are 170K, a REL file could use up the whole disk. The 180K limit also applies to the 8050. The speed of the system is incredible; maximum 3 clock reads to access any record, regardless of the file size. A maximum of three REL files can be open on the disk simultaneously provided no other files are open.

The command set associated with REL files is:

DOPEN#
RECORD#
INPUT#
GET#
DCLOSE#

REL files can be COPYed, SCRATCHed, RENAMEd, etc., just like any other file. Treat them no differently than any other file, but with the same amount of respect. REL files must be DOPEd and DCLOSEd properly, using ST and DS/DS$ for file status interrogation.

Example Set-Up

First you must decide how many bytes maximum your information will need. This will be the number of bytes maximum per field plus one byte for a carriage return at the end of each field. You could save on bytes by not using carriage returns but then you must know how to split up the record into fields using MID$ upon retrieval. Once again, no more than 80 characters without a carriage return.

Once you've chosen a length or record size, put it in a variable, say RS. Choose a logical file number, a filename and a drive and:

DOPEN#6, "Filename", DO, L (RS)
You can write or read a REL file once opened. When DOPENing for the first time, the record size (RS) must be specified. After that, the length need not be given. If it is, it must be the same as before, or else a disk error will occur and the disk will abort the open attempt.

On creating the file, the disk proceeds to build records in disk RAM. These will be empty until you fill them with data. An empty record starts with CHR$(255) followed by RS-1 CHR$(0)'s. (see note 1)

You are now ready to store data. The DOPEN automatically positions to record number 1. After a PRINT#, the DOS will position to record 2. This means that placing multiple strings into a single record must be done using one PRINT# statement, or else the strings will go into successive record numbers. Assuming R$= CHR$ (13). . .

```
DO      100 PRINT#6, "HELLO"R;
        A$;R$;B$;R$;X%;R$;

DON'T   100 PRINT#6, "HELLO"R$;
        110 PRINT#6, A$;R$;
        120 PRINT#6, B$;R$;
        130 PRINT#6, X%;R$;
```

This would put"HELLO" in record #1, A$ in record #2, B$ in record #3 and X% in record #4.

This could be a drawback, especially if your variables are in an array and you wish to use a loop to output all to the same record #. This brings us to the RECORD# command.

RECORD#LF, (RR), (PN)

RECORD# tells the file (LF) to position to record number RR at byte position PN within the record. The variable PN can be from 1 to 254. Variables in the RECORD# command must be enclosed in brackets. Output using a loop might look like:

```
100 PN=1
110 FOR J=1 TO NF
120 RECORD#6, (RR), (PN)
130 PRINT#6, FL$(J),R$;
140 PN=PN+LEN (FL$(J))+1;+1
for carriage return
150 NEXT
                ;NF=number of fields
```

The ";R$;" in line 130 could be left off since this would be handled by BASIC.

Another method would be to concatenate the fields into one string and output:

```
100 FL$=" "
110 FOR J=1 TO NF
110 FL$ = FL$+FL$ (J) +R$
120 NEXT
130 PRINT#6,FL$
```

Remember. . .strings in memory can be maximum length of 255. Maximum REL record length is 254. If you print a string to a REL record that is longer than the record length, an OVERFLOWING RECORD error will occur in the error channel. But, the first RS characters of the string will make it into the record; the rest will be lost. Should this happen, there probably won't be a carriage return at the end of the record. That doesn't matter. You will still be able to retrieve this data. As a matter of fact, carriage returns are not necessary at the end of a record, even if the data doesn't fill the record! "But why?, you ask. . .

REL Record Retrieval

As mentioned earlier, an empty record starts with CHR$(255) followed by RS-1 CHR$(0)'s. This is done by the DOS. Let's say our record size is 50. If we take the characters H, E. L, L, and O, and send them into REL REC #1 starting at position 1 without a carriage return, (i.e. PRINT#6,"HELLO";) the DOS would do as it's told and put "HELLO" into REL REC #1 with no carriage return. Not too surprising. However, once that's done, the DOS proceeds to "pad" the remainder of the record with CHR$(0)'s; in this case 45 of them. The DOS is now positioned at REL REC #2.

Now let's say we position back to REL REC #1 with RECORD#6, 1 command. The INPUT# command stops on carriage return or EOI. ST is set to 64 on EOI, otherwise ST=0. (see note 2 for details)

If we now execute an INPUT#, the DOS sends the H, E, L, L, and O. But when the DOS sees the CHR$(0) it also sends EOI which is just as good as a carriage return. ST is set to 64 and the DOS positions automatically to the next record; REL REC #2.

The DOS would also send EOI if the character being sent was from the last position in the record. In this case the record is not full, but this means that the character in the last position doesn't have to be a CHR$(13). You can save one byte per record this way. For 2500 records that's almost 10 full blocks!

Back to our example. INPUT# terminated when the DOS saw CHR$(0) and sent EOI. This has further ramifications. Suppose you were to execute something like:

```
100 RECORD#6, 1, 1
110 PRINT#6, "HELLO"; or
"HELLO";R$;
120 RECORD#6, 1, 20
130 PRINT#6, "JIM";
```

there would be CHR$(0)'s left in between "HELLO" and "JIM". "JIM" would be lost forever to INPUT#, unless you position back to it using RECORD# before INPUT#ing. Otherwise, only GET# could get it back. The DOS does not send EOI with CHR$(0) when using GET#.

Therefore, if you're anticipating blanks between data, or blank fields representing no data, it's best to construct the record in RAM first using spaces as field padding. Remember though, leading spaces will PRINT# to the disk, but INPUT# (as with INPUT) ignores them. Leading spaces include spaces immediately following a carriage return within a record.

Printover

Recall that the PRINT# command sends the characters into the record and then pads to the end of the record with CHR$(0)'s. This can be hazardous, especially if valid data exists beyond the data being sent into the record. This data would be wiped out with zeros. One more reason why you should construct the record in RAM first. You could get around this by putting the new data into the disk buffer with a "Memory-Write" routine, but that's fairly advanced and we won't cover that here.

End of File Detection

The following routine could be used to read the entire contents of REL file:

```
10 DOPEN#8,"FILE NAME"
20 INPUT#8,AS
30 PRINT AS
40 IF DS=50 THEN DCLOSE#8
:END
50 GOTO 20
```

On DOPENing, the file positions to record 1 and automatically positions to successive records after INPUT#ing each record's valid data. This would continue until reaching a record that *hasn't yet been formatted.* DS/DS$ would read 50, RECORD NOT PRESENT. But the last record *used* isn't necessarily the last record *formatted* (see note 1). Storing the number of the last record used would take care of that. Give it a SEQ file of its own and update it every time it changes using "@" write with replace. Empty files start with CHR$(255). This gets done by the DOS initially, but if a record DELETE is done, this "empty" flag should be replaced (i.e. PRINT#1f, CHR$(255)). This available file space can be detected for future use.

One Minor Gotcha

When a REL file is DOPENed for the first time, only one sector is allocated for data. If the file is aborted (i.e. no DCLOSE, DIRECTORY display, reset, etc.) before the DOS allocates a second data sector, the side sector information doesn't get written to the disk. The second data sector allocation forces the side sector onto the disk, but DCLOSing properly will always prevent this.

To be absolutely sure, although it is probably unnecessary, the following routine could be used:

```
50000 DOPEN#1f, "FILE
NAME", DO,L(RS)
50010 RECORD#1f, (INT
(254/RS) +1
50020 PRINT#1f, CHR$ (255);
50030 DCLOSE#1f
50040 RETURN
```

The fix actually defeats its own purpose as the file is properly DCLOSED in line 50030!

This would only have to be done once and your file is ready for I/O. Once again, the record size (RS) need only be given in the very first DOPEN.

NOTE 1

When a REL file is created, the DOS goes looking for some RAM to use inside the disk unit; a 256 byte buffer. The first two bytes are used to store the track and sector numbers of the next sector in the REL file just like SEQ files. The remaining 254 bytes are for record space, hence the 254 byte maximum record size. At this

point the DOS fills the record space with CHR$ (0)'s and puts a CHR$ (255) "marker" in the first byte of each record. This byte would be a multiple of the record size. If the record size were 50, there would be CHR$ (255) at bytes 2, 52, 102, 152, 202, and 252 (offset by 2 due to track & sector bytes at 0 and 1).

If REL REC #1 were currently being written to or read from, you could proceed to read or write REL RECs 2, 3, 4, and 5 without any mechanical disk activity. Requesting record #6 (i.e. RECORD#1f, 6, 1) would return an error #50, RECORD NOT PRESENT BECAUSE DISK space for a 6th record hasn't yet been formatted. But 5 records don't fill the buffer completely; there are still 4 bytes left (252-255). These belong to record #6. The next PRINT# would start putting characters into these 4 bytes, at which point the DOS would find another available sector, stick its co-ordinates into bytes 0 and 1, and write the buffer contents onto the diskette. Now the buffer is re-formatted with the first 46 bytes of the record space belonging to record #6. A DCLOSE would write the rest of the data to disk. Requesting record #3000 would force the DOS to format all records in between before allowing access to the record.

NOTE 2

1. INPUT# continues to input characters from the disk until it sees a carriage return (, comma or a colon but we'll ignore these here). The next line of your program should be a check of ST. If there is more data, ST will be); if note, ST will be 64.

2. INPUT# also terminates on receiving EOI (End Or Identity). EOI has a line of it's own on the IEEE bus. INPUT# checks the line. If it turns on, then no matter what character INPUT# has just received, inputting stops and ST is set to 64.

That all sounds like a lot but it really isn't. The Relative Record System is really quite easy to work. Being new, it'll take some getting used to. Once you're storing data in REL RECS, you'll hate to think how you did it any other way! ■

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Book Review

PET Interfacing
by James M. Downey & Steven M. Rogers
Publisher: Howard W. Sams & Co., Inc.
Price: $16.95

This book is directed to PET/CBM users who want to expand their system by interfacing devices to the user port, memory expansion port and/or the IEEE-488 port.

PET Interfacing gives you a better idea of how specialized interfaces can be built for use on PET/CBM computers. The three types of interfacing discussed are the user port, the memory expansion port and the IEEE-488 port; each having a specific use. Construction of several breadboarded interfaces are outlined and many experiments are suggested for you to learn more about control signals and input/output programming.

You should have a good understanding of Commodore BASIC (bit-oriented operations especially) and be able to read simple schematic diagrams before trying to build these interfaces. To get the most out of the book you should also be familiar with the wire-wrap breadboard construction techniques and you should have some understanding of the functions of the SN7400 (or equivalent) family of digital electronic components. Although all programming examples in the book are written in BASIC, Assembler language programmers will be able to convert the example programs to achieve the operating speeds necessary for controlling high-speed devices.

The introductory chapter is painfully elementary compared to the rest of the book; we are told about bits and bytes, the difference between RAM and ROM and about the ASCII character set. The space devoted to this could have been better used to present information on integrated circuits used in the experiments and on tools and construction techniques.

Chapter 2 guides you through building the breadboard for the user port experiments, wiring and checking out the on-board logic probe. The instructions for building these circuits are clear and complete with one notable exception – no parts list. In fact, only one or two experiments in the whole book include a list of required parts. It seems a shame to make people wade thru a whole chapter of text to find all the bits and pieces needed for an experiment.

Several interfacing experiments with the user port are covered in chapter 3. Here the authors really start getting down to cases and you may have some difficulty with this (and later) chapter if you cannot read the schematics provided. First, a parallel output port is built and some BASIC program examples are given to illustrate software control of the port. Then handshaking control lines are added and more BASIC programming examples given. Next, a similar procedure is followed to build a parallel input port. Serial I/O using the 6522 VIA shift register is also covered in this chapter. Finally, schematics and some guidelines are presented for construction of a dual-channel digital-to-analog interface and a 16-channel, 8-bit analog-to-digital interface.

Chapters 4 and 5 provide some background information on the memory

Book Review

expansion port and on address decoding in the PET, then outline construction of an I/O breadboard for experiments with the memory expansion port. Chapter 6 guides you thru adding address decoders, an input port and an output port to the breadboard. Again the authors make liberal use of BASIC program examples to illustrate control of these interfaces. Advanced topics such as I/O ports with more than eight bits and use of the 6520 Peripheral Adapter are also discussed in this chapter.

Chapter 7 presents some handy interfacing hints and kinks. These include an interface for inputting 3-½ digits of binary-coded decimal data from a digital volt-meter, BASIC programming examples for controlling an X-Y plotter and some notes and circuits for interfacing to high-power non-TTL devices.

The last chapter covers interfacing to the PET IEEE port. The IEEE bus signals are defined and differences between the PET's IEEE usage and the true IEEE-488 standard are discussed. The input/output sequences of commands/data on the IEEE port are described in detail – down to the high/low state of each control or data line. The PET IEEE listener/talker sequences are described and flowcharted. The first of two experiments in this chapter presents schematics and helping hints to build an IEEE interface to a 300 baud serial printer using either RS-232 or 20 ma. current loop.

The final project presented in **PET Interfacing** is "an *advanced* construction project designed for those who want to interface custom-designed hardware to the PET through the IEEE port" – the emphasis is the authors'. Schematics and construction/checkout notes are given for building a micro-processor-based general-purpose IEEE listener/talker interface with two parallel I/O ports available. Expanded flow-charts or the PET IEEE listener/talker sequences and an Assembly listing of the device handler code resident in the listener/talker are given in appendices.

The bottom line. . .is this book worth the price? If you are experienced at building kits using digital components (not me, I still mess up Heathkit alarm clocks) then the answer is definitely yes! The time saved in designing a specialized interface could be substantial. Even if you don't plan on building the experiments outlined in **PET Interfacing**, the author's descriptions of the user port and IEEE port operations are almost enough by themselves. ■

Dave Middleton

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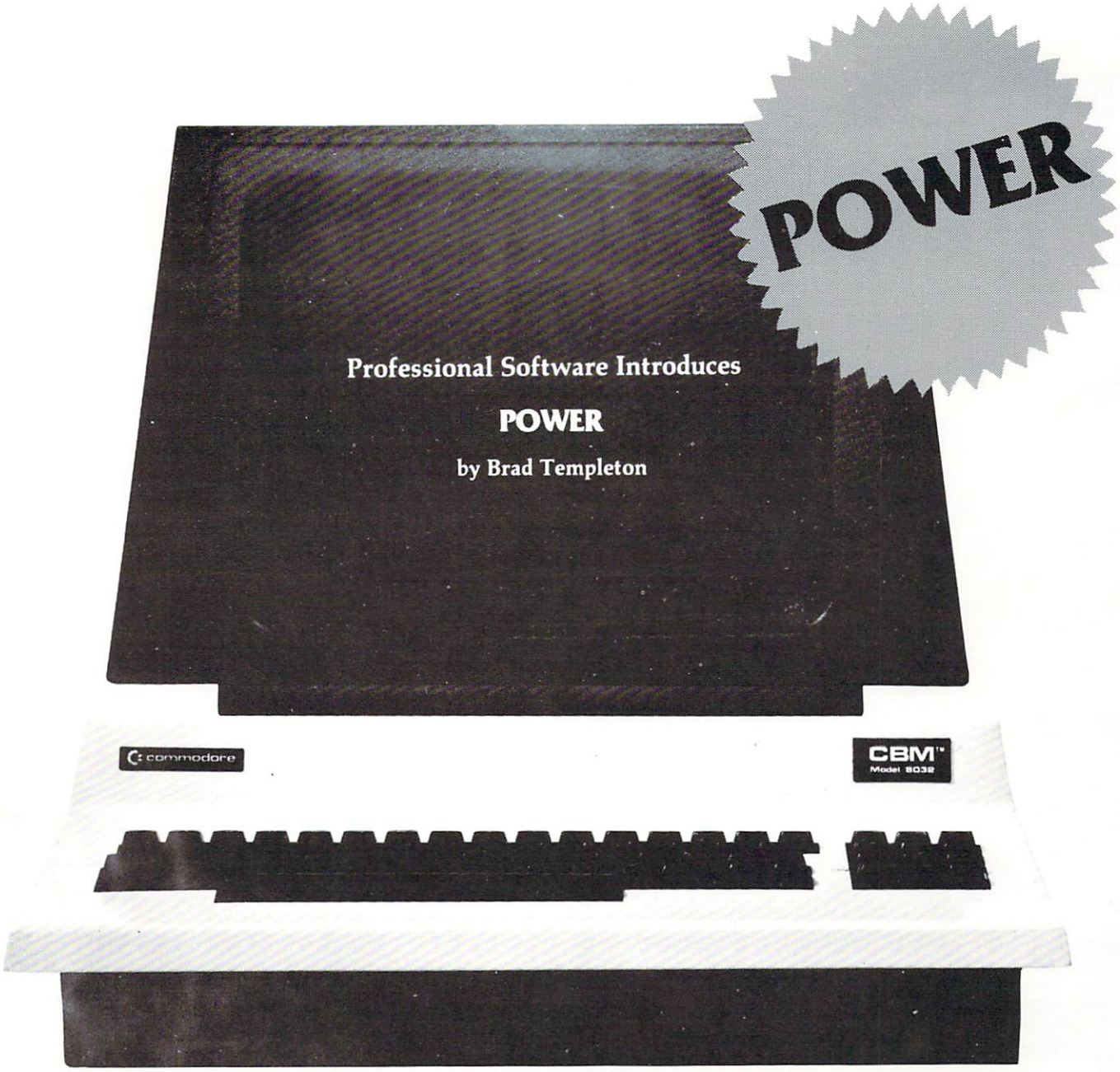

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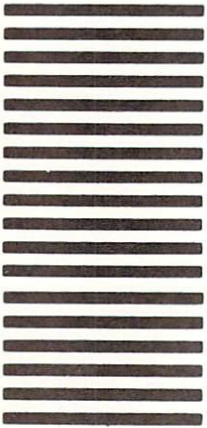

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